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Paper TRADE JOURNAL

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VOLUME 124, No. 8 FEBRUARY 20, 194

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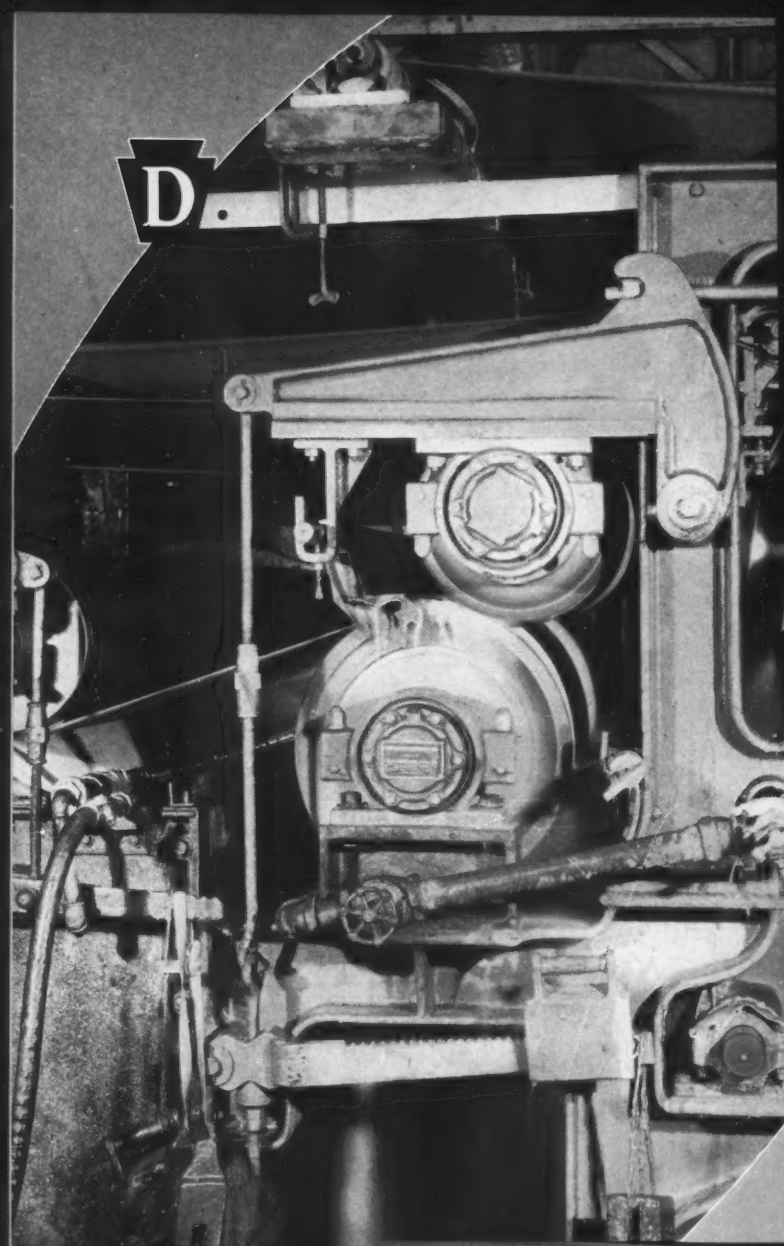

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ABOVE, installation of plain Extractor and RIGHT, a combination of plain and Suction-Extractor.

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Paper Making Machinery

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Volume 124 — **Number 8**

Paper TRADE JOURNAL

REG. U. S. PAT. OFF.

Executive and Editorial Offices: 15 W. 47th St., New York 19, New York
Published Every Thursday by Lockwood Trade Journal Co., Inc.

GEO. E. LOCKWOOD, *President & Treasurer* ARTHUR E. GORDON, *Vice-President* JOSEPH P. HORGAN, *Secretary*
W. L. COOK, *Editor* • HARRY I. JENSEN, *Assistant Editor* • R. G. MACDONALD, *"TAPPI" Editor* • F. B. GROSSE, *Make-Up Editor*

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Representative for Denmark, Norway, Sweden and Finland
OXFORD TRADING AKTIEBOLAGET
Bibliotekgatan 6-8, Stockholm, Sweden

Subscriptions: (Payable in advance) By the year, $5.00; Single Copy 15 cents. *Postage Extra: To Canada, $2.00; To Other Foreign Countries, $3.50.*
Member Audit Bureau of Circulations.

PAPER established Feb. 17, 1899, combined with PAPER TRADE JOURNAL *Nov. 16, 1899,* PAPER *established Sept. 21, 1910, combined with* PAPER TRADE JOURNAL *Feb. 19, 1926.*

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PAPER TRADE JOURNAL is entered as Second Class matter at the Post Office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc.; 34 N. Crystal St., East Stroudsburg, Pa. Printed in U. S. A.
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CALENDAR OF COMING EVENTS

February 23-27, 1947—The American Paper and Pulp Association, Annual Meeting, The Waldorf-Astoria, New York City

February 24-27, 1947—Technical Association of the Pulp and Paper Industry, Annual Meeting, The Commodore, New York City.

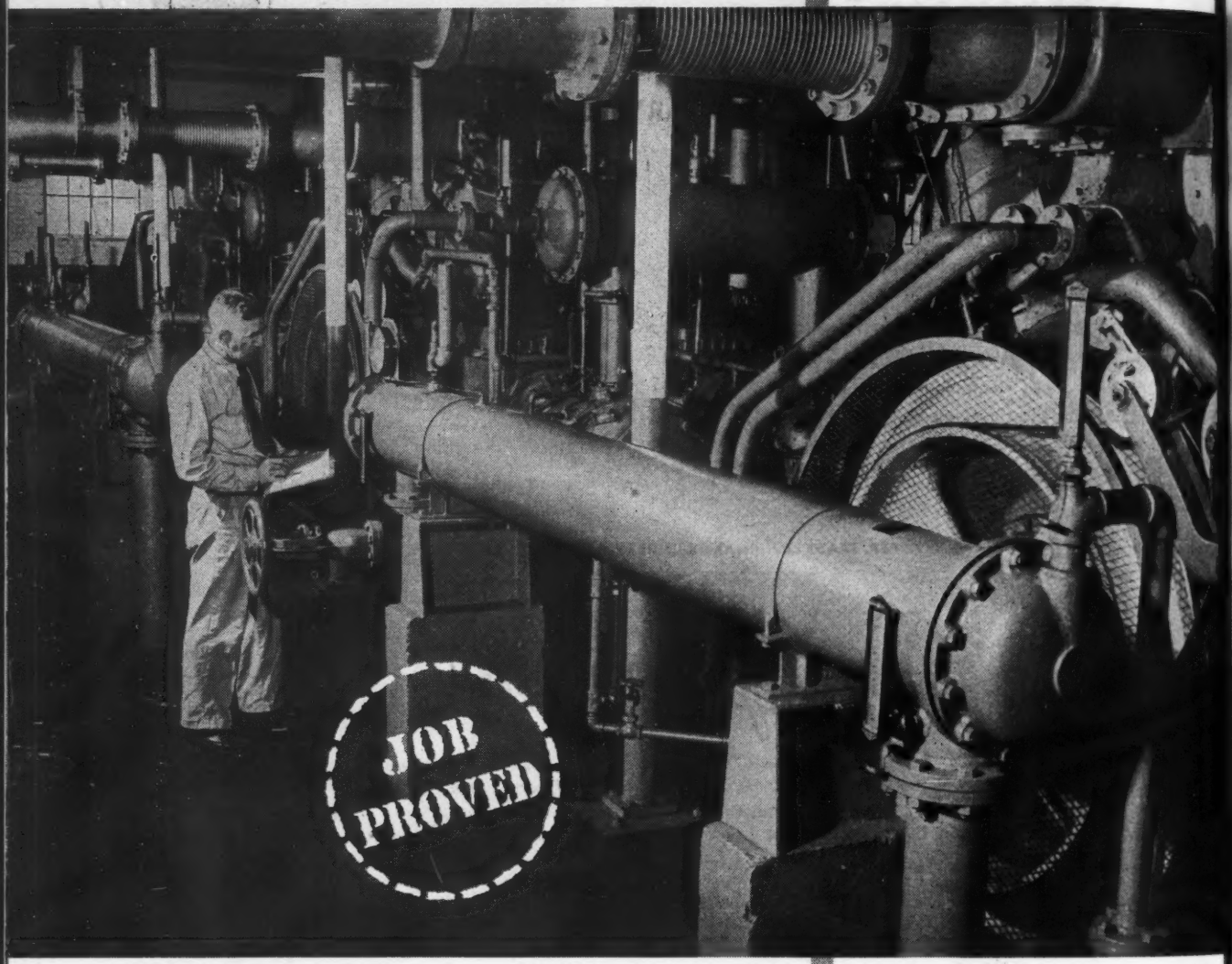
February 25, 1947—New York Association of Dealers in Paper Mill Supplies, Inc., Annual Banquet, Hotel Commodore, New York City.

February 25, 1947—New York State College of Forestry Alumni, Annual Luncheon, Hotel Commodore, New York City.

March 31-April 1-2, 1947—National Paper Trade Association, Annual Convention, The Waldorf-Astoria, New York City.

May 22-24, 1947—American Pulp and Paper Mill Superintendents Association, Annual Convention, Edgewater Beach Hotel, Chicago.

Compressing Maintenance Problems



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Paper TRADE JOURNAL
REG. U. S. PAT. OFF.
VOL. 124, NO. 8 FEBRUARY 20,. 1947

Newsprint Output Up To New January High

NEW YORK — Newsprint production in Canada during January 1947 amounted to 370,000 tons and shipments to 344,543 tons, according to the News Print Service Bureau. Production in the United States was 68,634 tons and shipments were 69,492 tons. The output in Newfoundland was 32,207 tons and shipments were 22,933 tons making a total North American production of 470,841 tons and shipments of 436,968 tons. Total production in January 1946 was 427,019 tons and shipments were 412,197 tons.

The Canadian mills produced 41,586 tons more in January 1947 than in January 1946, which was an increase of 12.7 percent. The output in the United States was 815 tons or 1.2 percent above that in January 1946; in Newfoundland production was 1,421 tons or 4.6 percent more, making a total increase of 43,822 tons, or 10.3 percent more than in January 1946, and was greater than in any January on record.

Stocks of news print paper at the end of January were 113,231 tons at Canadian mills, 14,360 tons at United States mills, and 68,024 tons at Newfoundland mills, making a combined total of 195,615 tons compared with 161,742 tons on December 31, 1946, and 157,883 tons at the end of January 1946.

Appeals Court Affirms Scotch Tape Patent

CHICAGO — The basic "SCOTCH" Cellulose TAPE patent of Minnesota Mining and Manufacturing Company, by the U. S. District Court at Chicago in 1945 and again in 1946, held to be valid and infringed, was sustained by the U. S. Circuit Court of Appeals in a recent decision. The patent covers the transparent and colored pressure-sensitive Cellophane tape originated by R. G. Drew of St. Paul and promoted and marketed broadly by Minnesota Mining under its trade name "SCOTCH" Cellulose TAPE.

The Circuit Court of Appeals, with full concurrence of the three judges, affirmed the judgments of the District Court holding the patent valid and infringed by each of the defendants, International Plastic Corp. and David A. Smart of Chicago, and Freydberg Bros.-Straus, Inc., and Bulkley Dunton & Co., both of New York. The District Court also held that Minnesota Mining and Manufacturing Company is entitled to a permanent injunction and accounting against each of the defendants, which was also affirmed by the Court of Appeals.

ANPA Blames Competitive Bids For High Cost of Spot Sales

NEW YORK—Newspaper publishers, members of the American Newspaper Publishers Associaion, over the week-end turned the spotlight on current market conditions, found that none of their number have actually been deprived of paper, paid tribute to the cooperative policies of Canadian newsprint mills, and recorded the fact that competition among buyers is largely responsible for rises in the spot-delivery price of newsprint. Newsprint consumption among members rose in January by about twenty per cent over that of January a year ago and about 16 per cent above January 1941.

In a statement made public late last week the ANPA declared that it is checking constantly on reports from various sources concerning newspapers, both daily and weekly, finding themselves without a regular newsprint supply and confronted with suspension. Every report is checked carefully in an effort to obtain the essential facts. So far as the ANPA can find out there are now no instances of United States newspapers being without a newsprint supply where the publisher and the mills deal directly.

"The ANPA, speaking for its membership, is anxious that no publisher be faced with suspension of his newspaper through lack of newsprint supply. The ANPA is desirous that all mills maintain supply at least in 1946 volume for merchants selling to newspapers and for small consumers, most of whom rely on merchants for supply.

"The ANPA does not know of any instance of U. S. newspapers being without a newsprint supply due to cancellations of tonnage by Canadian manufacturers to newspapers. It is known that Canadian manufacturers have filled a number of gaps in supply caused by the change of certain U. S. mills from production of newsprint to production of other papers and curtailment of newsprint imports from Scandinavia. In some cases of distress reported to the ANPA, involving purchase of newsprint by newspapers through a merchant or jobber, the Canadian mills have arranged to supply the merchant with newsprint to meet the minimum requirements of his newspaper customers.

(Continued on page 16)

Midwest Seeks Trend From Paper Week

CHICAGO — Considerable interest is being evidenced in the forthcoming "Paper Week" program in New York City. Next week, Chicago representatives of the trade who will attend, expect to get a good insight on production increase possibilities, on the success of selling programs which have utilized "substitution" methods to overcome shortages in so-called standard lines, and on the general price structure for the future.

Locally, the market is as firm as it ever was, despite some hesitancy and shakiness in general business. As many paper trade leaders forecast, the paper industry has no reason to worry about a 1947 "readjustment," what with supply, demand and allied lines in their current condition. Interesting were the reports of continued demand for the "military" papers despite the conclusion of the war. Book and covers also remained very strong locally.

Waste paper held steady with mills reported paying $33 for corrugated, $20 for mixed grades and $30 for news. Better collections were noted as the weather improved and mills again had the opportunity to collect some surpluses after the depressing effect of last week's low tempertaures and blizzard conditions. It was reported here that the War Department this week was offering for bid some fifty-nine tons of waste paper, the bids to be opened on February 24, Langley Field, Va., on 36 tons of corrugated containers, 20 tons of No. 1 mixed and three tons of No. 1 heavy books and magazines.

Paper Box Men To Meet

PHILADELPHIA—The National Paper Box Manufacturers Association will hold its annual convention at the Hotel Traymore in Atlantic City on May 18 to 21.

Building Plans Stir The Mohawk Valley

COHOES, N. Y. — Among the large concerns in the Mohawk Valley planning further expansion of facilities are the Mechanicsville branch of the West Virginia Pulp & Paper Company and the Watervliet plant of the Behr-Manning Corporation. Plans for the immediate construction of a steam generating unit costing more than $500,000 is announced by the former concern in its annual report. The project in that village is part of a $19,000,000 construction program affecting several branches outlined for the immediate future, aimed at low cost, efficient production rather than expanded operations. The report discloses that the payroll of the firm reached an all-time high of $19,359,592 during the past year, reflecting increases both in the basic wage rate and employment.

A total of 597,984 tons of paper and paperboard, an increase of about 6.36 per cent over 1945 was produced, resulting in net sales of $67,211,929 and a 13.6 per cent rise over 1945.

Net earnings were listed as $5,103,607, representing a return of 8.6 per cent on capital employed. The company attributes the good showing during the year to the fact that it was possible to maintain plants on full production schedules because very slight reconversion to peacetime operation was necessary, the plants are highly integrated, and also because it was not hampered by labor difficulties as a result of early and adequate adjustments in working arrangements.

Approval of a steel framework for a new building at the Watervliet branch of the Behr-Manning Corporation has been granted by the Civilian Production Administration. The cost will be $62,320. The one-story structure will be 400 by 300 feet and will be used for the production of abrasives. In its application the firm pointed out that coated abrasives are necessary for sanding materials essential to the Veterans Emergency Housing program.

The firm stated that its production in abrasives had increased 70 per cent since 1941 with a comparative increase in employment. An extensive expansion program has been under way for some time past and several new buildings have been annexed to the Watervliet property.

Paul Hodgdon Plans New Texas Glassine Plant

NEW YORK — Paul Hodgdon this week made known the completion of plans for a new glassine company to be located in Texas. Orders are being placed immediately for a new Fourdrinier, which since it is to be located in Texas, is to be called the "Blue Bonnet", and is expected to be the biggest yet. In any event it will trim well over 200 inches and will probably get into operation during the latter part of 1948.

Woodfibre Mill Buys Barker and Chipper

WOODFIBRE, B. C.—Steady progress is being made in the development of the plant of the British Columbia Pulp & Paper Company, Ltd. The company is installing a new hydraulic barker and a whole log chipper. Clearing the site and driving piles for the hydraulic barker building was completed during December with more than 600 poles placed for the building and machinery foundations.

To date Canadian Sumner Iron Works has shipped to Woodfibre a combination 12 by 14 inch steam nigger along with a special 16 by 24 inch log kicker. The big 175 inch chipper will go up the coast by car barge. This chipper will take logs up to 40 inches in diameter, effecting a substantial saving in sawing, as most logs will go directly to the chipper.

Next job at the Canadian Sumner plant will be erecting the hydraulic barker. Similar machines in use in the Pacific Northwest states are averaging 50,000 board feet per hour on normal good logs and using 600 gallons per minute.

Avoid Fire Damage at Mt. Tom Sulphite Mill

NORTHAMPTON, Mass. — Fire at the Mount Tom Sulphite Pulp mill, newly purchased by the San-Nap-Pak company, gave local firemen a difficult time.

The telephone alarm was that the "chip bin is afire" and many apparatus were rushed to the scene because of the highly inflammable materials. On arrival, however, it was found that the bins were not afire, but that a quantity of dust which had gathered in the 12-inch space between the chip bins and the outside walls had ignited, probably from the heat of steam pipes.

Neither the outside walls nor the bins caught fire, and the blaze was confined to the space between the two walls. Firemen had difficulty reaching the blaze in the tiny space, but put the fire out before any damage was done.

Sulphite Group to Hear Corlett on Free Enterprise

NEW YORK—H. O. Nichols, General Chairman of the Sulphite Paper Manufacturers Association, Inc., which will hold an Association luncheon meeting at 12:30 P.M. on Monday, February 24, in the Jansen Suite at the Waldorf Astoria Hotel, has revealed that the speaker at that meeting will be W. W. Corlett of Wise, Corlett & Canfield, whose subject will be "The Preservation of the Free Enterprise System." "Bill" Corlett is well known in the paper industry and has chosen a topic that is of paramount interest at this time so that a large attendance is assured.

Sunoco Tells Plans For Hartsville Mill

HARTSVILLE, S. C.—James L. Coker, president of Sonoco Products Company, has made known that the new paper making machine to be built at the Hartsville plant will be a Fourdrinier machine and will produce .009 corrugating board at the rate of approximately 80 tons a day.

"Gum pulp will be used in producing the board on the new machine," Mr. Coker said. He added that Sonoco's pulp mill will be started up again after a few changes and necessary repairs are made.

"The building which will house the new machine will be erected between Paper Mill No. 1 and Paper Mill No. 2," he continued. "Construction will start shortly and it is expected that the machine will be in operation by October.

"The new project will cost approximately $1,300,000, of which the prospective buyers of the machine's product will put up one-third each. Sonoco will put up the balance and in time will own the entire building and the machine under a working agreement with the two customers.

"The companies that will buy the corrugating board are the Ohio Boxboard Company, of Rittman, Ohio, and the Hankins Container Company, of Cleveland, O. These two firms will take the full output of the mill."

Superintendents Plan For April Meeting

HOLYOKE, Mass. — The activities committee of the Connecticut Valley Division of the Paper Mill Superintendents met at the Hotel Essex recently and decided to hold the association's next monthly meeting at the Roger Smith Hotel on April 12. Another meeting of the activities committee will be held prior to the April meeting to map the program for the meeting and to select the principal speakers.

On the committee are: Raymond Winkler of the Chemical Paper Co., chairman of the Associations Valley Division; Arthur Loomis, secretary-treasurer; John Brown, Chemical Paper Co.; Frank Johnson, superintendent of the Crocker-McElwain Paper Co., and Robert W. Pattison, chairman of the activities committee, who is affiliated with the American Writing Paper Corp.

Western New York Containers Fits Out Lockport Plant

LOCKPORT, N. Y. — Installation of equipment for the manufacture of corrugated shipping containers and paper specialties in a plant at Gooding and Grant streets here has been started by a new firm, the Western New York Containers Corporation, and production will start in about six weeks.

Safe, sure, efficient lubrication smooths the way to greater production, lower maintenance costs

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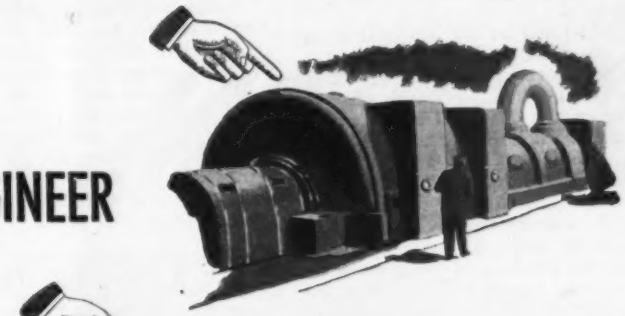

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Blank Book Awards To 349 Old Timers

HOLYOKE, Mass.—Service pin awards to 349 old timers of the National Blank Book Company were made at a company family party at the War Memorial building.

An old timer at the National is one who has been with the company 15 years or more. These 349 old timers have given a total of 9950 years of service at the National and company officials paid honor to them at the gathering.

Dinner was served down stairs at the War Memorial to some 600 people. It probably was the largest dinner gathering in the city's history.

The old timers and their husbands and wives, for there are men and women in this honor group at National, were guests. After dinner, they adjourned to the auditorium to see the awards made and hear company officials talk about memories of the past and discuss plans of the future.

Richard P. Towne, treasurer of National and described by master of ceremonies Paul Buckwalter as "navigating officer," reminisced on the good old days and talked about present day problems and their impact on what may be ahead.

Towne said that the National had plans to embark on a $500,000 new machinery installation program. It's one that will take some years to complete inasmuch as the company hasn't got that amount of free cash.

The war took its toll in more ways than one. Extraordinary usage of machinery increased depreciation and the excess profits tax drained away much of the reserves.

The National paid $1,950,000 to the government during the war in taxes, which amounts to 72 per cent of the company's profits during that period.

"It left no reserve, no cushion to pay for our postwar building program. We are five years behind our program, and we've got to step on the gas. The company owes it to its employes to provide them with the best of machinery and tools with which to work," Towne said.

"We have traditions. One is for hard work and that goes from the top down. We think of the other fellow. That's the cooperative spirit. We are keen, smart on our toes. And we recognize our dependance on outsiders, our customers and our suppliers," he added.

Towne discussed the happy relationship between all the groups of the far flung company. He used a chart that graphically described the growth of the company. It was based on an industry average of five per cent a year gain for the past 50 years, and showed how National has followed that pattern.

"But we have a sales department that is shooting for bigger things than the average. It's pointing to a 25 per cent gain. That means more work, better production and it means we'll have to get new machinery," Towne said.

He concluded by saying, "You are the power that controls the whole organization. You make us what we are today. As far as management is concerned, we don't have secrets. You ask us. Maybe we can't give you the answers and we'll tell you why we can't. But you ask us. You have an investment in the National."

Following Towne's address, which completed the speaking, the old timers marched in their own class groups to the stage to get their service pins.

The 50-year and above group was the first. There were 11 of these old timers, eight of them now working at National and three retired. Their combined service is 599 years. In the 40 year group there were 43, who together have worked 1861 years.

Paul Jones Elected NEPMA President

BOSTON, Mass. — Paul M. Jones, Storrs & Bement Co., Boston, was elected president of the New England Paper Merchants Association at the annual meeting. One hundred one members of The New England Paper Merchants Association, Fine and Wrapping Papers, from the six New England states, gathered together Wednesday evening, February 5 at Parker House Starlight Roof, Boston for dinner and the Annual Meeting, President James J. Dwyer presiding.

In his annual report President Dwyer expressed optimism about future business prospects for paper merchants and pointed to the production of 19,200,000 tons of all kinds of paper last year, saying it was the largest in history. Despite this record production he said paper merchants were operating in a short market. Although supply and demand were not yet in balance he said business would, in his opinion, be good for some time to come.

Following the election of this slate the gathering was treated to a most inspiring and constructive address by Laurence F. Whittemore, President, Federal Reserve Bank of New England. Among other points Mr. Whittemore observed "We are particularly fortunate in New England because the people here enjoy a higher per capita income than the people in any other section of the country. We also have reason to be optimistic because the country as a whole has just passed through a year of unparalleled prosperity. In addition we have just won the greatest war in history and we financed it ourselves without any aid from anyone else. The whole picture is awfully good." Topic of his address was "1947 Business Prospects."

Beekman Group Visits Eagle A

HOLYOKE, Mass. — The Beekman Paper & Card Company, Inc., of New York sponsored a recent trip to this city to visit the American Writing Paper Corporation mills. In the party were 37, including 29 students of the New York School of Printing.

Abitibi's Refinancing Raises 45 Million

TORONTO—Subscription books on the $45 million 3½ percent Abitibi debenture issue offered the public last week by a syndicate headed by Wood, Gundy & Co., have been closed. The issue, the largest corporate issue offered entirely in Canada, is reported to have met with striking success. The issue consisted of $10,000,000 serial bonds maturing $1,000,000 annually 1948-1957 and $35,000,000 of 20-year bonds due April 1, 1967. The bonds were offered at 100 percent and accrued interest. It is understood the $10,000,000 serial bonds were disposed of privately.

Proceeds, together with other funds, will be used to retire the outstanding $53,093,700 bonds at 5 percent due 1945 on or about April 1, 1947. Retirement of these bonds and discharge of the covering trust deed will mean the company will be returned to control of its common shareholders.

The prospects offered shareholders the first opportunity to examine results for the year 1946 and to see the balance sheet of Dec. 31, 1946. Because of the urgency in connection with the refunding, it was not possible to prepare the annual report in time to mail it to shareholders prior to the refunding, President D. W. Ambridge explains.

Plans for the improvement of productive facilities are being proceeded with to increase both output and efficiency and to diversify production, according to the president. The conversion of the mill at Sturgeon Falls, Ont., to produce corrugated board is now in progress and operations are expected to begin in the second half of 1947. An addition is being made to the Port Arthur newsprint mill to modernize operations and increase output. At Smooth Rock Falls, a caustic extraction stage in the bleaching process is being installed. A research program is under development at Sault Ste. Marie, where a modern research laboratory is being built.

Further extensive capital expenditures are in contemplation and will be proceeded with as materials become available.

Combined assets as at Dec. 31, 1946, exceeded $113,000,000, including net current assets of over $24,200,000.

The company's operations are currently close to capacity.

The $20,116,211 consolidated earnings figure is nearly double the $10,364,874 earned in 1945. This fact has set speculative minds busy figuring out the possible distribution to shareholders. One financial writer comes up with this: Earnings of over $2.50 a common share, $3.75 a $1.50 preferred share and $106 a $2.50 prior preferred share may be possible. This would compare with a deficit of 40 cents on the common and a profit of $1.14 on the $1.50 and $34.39 on the $2.50 preferreds based on 1945 earnings.

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It's completely new . . . it's completely different . . . it wraps up the advances made in "custom-built" wartime motors in a single package!

For 58 years, induction motors have been built fundamentally alike. Differences have been minor . . . improvements gradual. Today, in the new Life-Line, Westinghouse presents a major departure from accepted ideas of standard-motor limitations.

Life-Line, today, offers industry a truly all-steel protected motor. All exposed surfaces are HEAVY STEEL—frames of even the smallest sizes are ⅜" thick.

More compact power is packed in Life-Line. For example, on the 284 frame, size has been reduced 35%, although NEMA mounting dimensions have been maintained . . . starting torques are as much as 134% greater per pound of motor . . . maximum torques as much as 116% more per pound.

Electrical characteristics have been improved . . . new materials and new winding techniques give increased protection against electrical failure. And sealed, pre-lubricated bearings do away with need for greasing or attention for at least five years!

The Life-Line Motor, as a result, represents the biggest single step forward in design and construction since the invention of the electric motor 58 years ago. Life-Line Motors are now reaching the drives of industry by the thousands, but are not yet available in quantities to meet the unprecedented demand. So, look over Life-Line advantages now with an eye to your future requirements. Your local Westinghouse office can give you full details, or write to Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

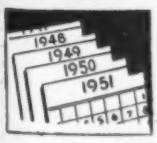
★ ★ ★

Life-Line Motors are now in production at the new Westinghouse Motor Works in Buffalo, N. Y. This plant is laid out, tooled and equipped to fully utilize newly developed production processes and techniques on a scale hitherto unequalled in the manufacture of electrical motors.

J-21406

LESS SPACE PER HP. Life-Line Motors occupy less space per horsepower than any other standard motor . . . making it easier to build into machines and install in cramped quarters.

MORE TORQUE PER LB. Life-Line Motors give as much as 134% higher starting torque per pound of motor . . . up to 116% higher maximum torque.



NO LUBRICATION FOR 5 YEARS. Life-Line Motors need no greasing for AT LEAST FIVE YEARS. Bearings are pre-lubricated . . . sealed against dirt and moisture.

IMPROVED WINDINGS. New insulating materials . . . new coil winding techniques . . . new stator slot designs . . . give the Life-Line new record-setting protection against electrical failures.

NEW QUIET SMOOTHNESS. Life-Line Motors cut vibration and noise to new low limits for standard motors . . . satisfy many "special motor" requirements.

NEW SLEEK LINES. The Life-Line has sleek lines . . . a smooth finish . . . discourages dust and dirt accumulations . . . harmonizes with modern machine and tool design.

Life-Line motors

FINANCE

Continental Sales Up Net Profits Fell Off

NEW YORK—Continental Can Company, Inc., and wholly owned subsidiaries reported consolidated net income for the year ended December 31, 1946, of $6,162,944 which, after dividends on the $3.75 cumulative preferred stock, was equivalent to $1.96 a share on 2,862,431 common shares outstanding. This compares with net earnings in 1945 of $5,767,560 or $1.86 a common share after preferred dividends. Net profits for 1946 before providing for taxes amounted to $9,762,944 compared with $11,067,560 in 1945. Total net sales and operating revenues for the year were $212,924,315 as compared with $206,071,252 in 1945.

A $1,200,000 carry-back claim for refund of prior years excess profits taxes was offset by the same amount appropriated for inventory price decline and other contingencies.

The balance sheet as of December 31, 1946, showed current assets of $94,158,598 and current liabilities of $21,132,708, an excess of $73,025,890 in current assets over current liabilities.

In his annual report to stockholders, Hans A. Eggerss, president, said: "Price adjustments on your company's products during 1946 were very limited. As a result the company was compelled to absorb substantial increases in costs of labor and other items with practically no offset in higher prices. Effective January 1st, 1947, the prices of both metal and paper containers were increased.

"Government controls on our production, while somewhat relaxed, are still in effect," he said. "Shortages in our principal materials have prevented removal of these controls and continue to be a limiting factor on our sales volume. It now appears that the supply of most of these materials will approach demand before the end of 1947."

Mr. Eggerss pointed out that after five years of operating under war-time restrictions and shortages, the company has started an urgently needed program of rehabilitating, modernizing and expanding plant facilities to meet greatly increased customers' requirements. To complement working funds available for this purpose, the company recently completed a $10,000,000 financing agreement with the New York Life Insurance Company whereby that company will purchase, at cost, land and buildings and then lease them to Continental for a long term of years. The first property to come under the terms of this agreement is a new Sacramento, California, plant building, transferred in December.

Mr. Eggerss also reported the approval on February 4, 1947, by the stockholders of Hummel-Ross Fibre Corporation of Hopewell, Virginia, of the sale of the net assets of such corporation to the company, in exchange for 293,780 shares of the company's common stock. Hummel-Ross Fibre Corporation produces kraft linerboard used in the manufacture of fibre drums and barrels in plants of The Container Company, one of Continental's principal subsidiaries.

Sidney Roofing Plans To Finance Expansion

VICTORIA, B. C.—Expansion involving the expenditure of one million dollars will be completed within the next eighteen months by the Sidney Roofing & Paper Company Limited, of Victoria. Forecast of the completion of its program was made by the company in reporting a public offer of Class "A" cumulative convertible shares being placed on the market through Wood, Gundy & Company.

The shares carry a cumulative preferential dividend of 90 cents per share every year and are convertible into Class "B" common shares at any time. The company said that its earnings in 1946, which are available to meet the $45,000 dividend requirements of the Class "B" shares, now totals $174,631.

Its $1,000,000 expansion program centers around the recent purchase of a new paper machine with a daily capacity of forty tons. Two hydropulpers are being installed at a cost of $150,000.

The company said a contract will be let soon for the construction of a $40,000 plant for the manufacture of "fibre-rock," a building board. A program of expansion is also under way at the company's subsidiary, National Paper Box Co. Ltd., in Vancouver, at a cost of $200,000.

United Wallpaper Sales

CHICAGO—Net sales of United Wallpaper, Inc., and domestic subsidiaries for the six months ended December 31, 1946, were $9,567,210. Net profit before taxes totaled $1,677,450. Net profit after taxes was $1,026,277, equivalent to net earnings of 83 cents per share on common stock outstanding.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending February 15, 1947

STOCKS

	High	Low	Last
A. P. W.	5⅞	5⅜	5½
Armstrong Cork Co.	51⅜	50	51
Armstrong Cork Co., pf.	108	107¼	108
Celotex Corp.	31¾	30⅞	30¾
Celotex Corp., pf.	21⅞	21	21¾
Certain-Teed Products Corp.	20⅛	19¼	19⅜
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	27	25½	25⅝
Champion Paper & Fibre Co., pf.	108	108	108
Congoleum Nairn Co.	30⅛	29	29⅛
Container Corp. of America	47	46	46¾
Crown Zellerbach Co.	31⅛	29¾	30¾
Crown Zellerbach Co., pf. 4.20	105⅞	104⅞	105⅛
Crown Zellerbach Co., 4 pf. 4	119¾	118	119¾
Dixie Cup Co.	33¾	32¼	32¼
Dixie Cup Co. A	....	....	....
Flintkote Co.	36⅜	34¼	35¼
Flintkote Co., pf.	107½	107½	107½
Robert Gair	8	7½	7¾
Robert Gair, pf.	20½	19⅝	20⅛
International Paper Co.	51¾	49¾	50¾
International Paper Co., pf.	....	....	....
Johns-Manville Corp.	137	132½	132½
Johns-Manville Corp., pf.	123¼	123	123
Kimberly-Clark Corp.	27¾	26½	27
Kimberly-Clark Corp., pf.	116¾	116¾	116¾
Mac Andrews & Forbes	....	....	....
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	27⅝	27⅛	27⅜
Mead Corp.	22	21½	22
Mead Corp., pf. 4¼	105½	104½	104½
Mead Corp., pf. 2	49½	49½	49½
National Container Corp.	40½	39	40⅛
Paraffine Companies, Inc.	79½	78⅛	79½
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	24⅛	23¾	24
Rayonier, Inc., pf.	38½	37⅝	38½
Ruberoid Co.	56	54¾	56
Scott Paper Co.	46	45	46
Scott Paper Co., pf.	99½	99	99
Sutherland Paper Co.	46½	44¾	44¾
Union Bag & Paper Corp.	33⅛	31½	33¾
United Paperboard Co.	14⅞	14	14⅜
U. S. Gypsum Co.	107¾	103¾	104½
U. S. Gypsum Co., pf.	192	192	192
West Virginia Pulp & Paper Co.	40	39	39⅛
West Virginia Pulp & Paper Co., pf.	115¾	110½	112

BONDS

Abitibi Pulp & Paper Co. 5s '53	....	....	....
Celotex Corp. 3⅛s '60	....	....	....
Certain-Teed Products Corp. 5½s '53	....	....	....
Champion Paper & Fibre Co. 3s '65	....	....	....
Mead Corp. 3s '66	....	....	....

New York Curb Exchange

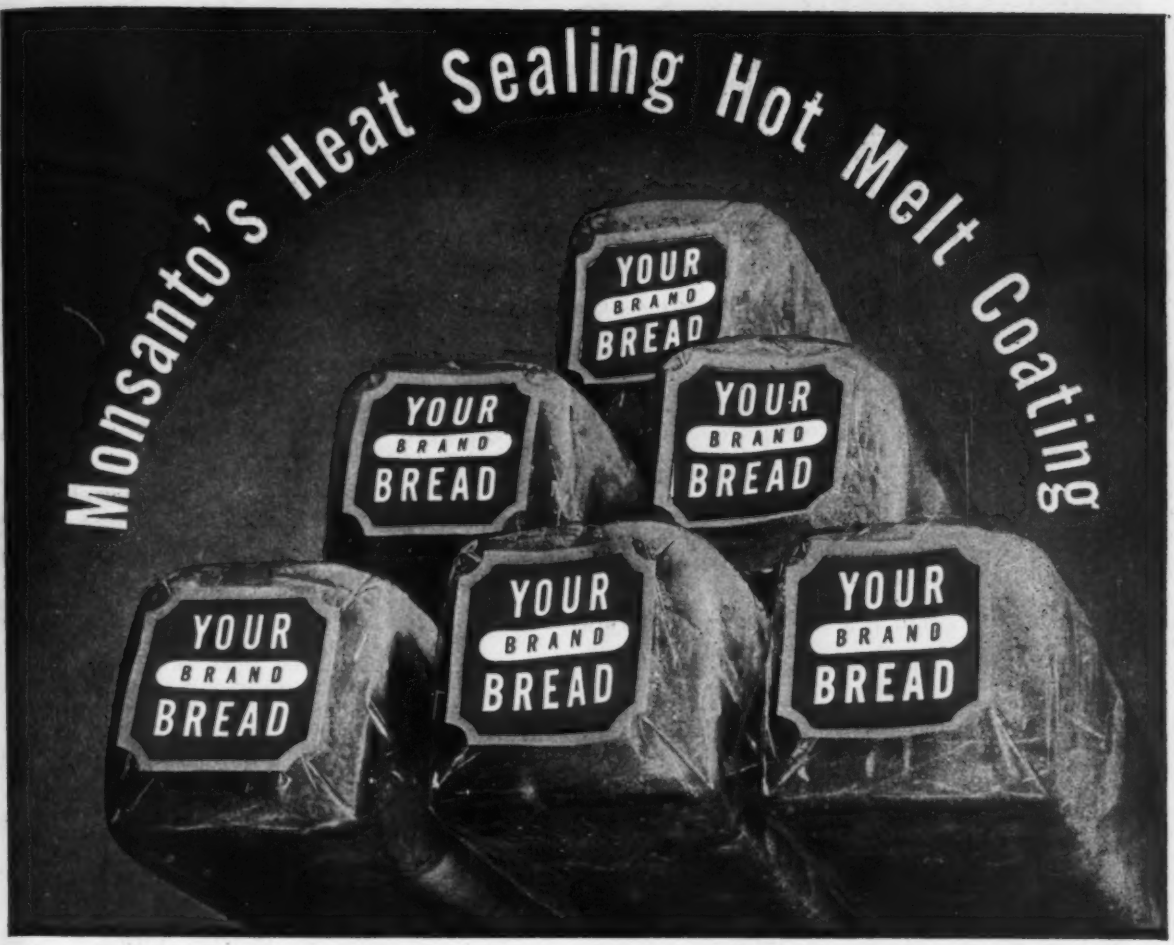
High, Low and Last for Week Ending February 15, 1947

STOCKS

	High	Low	Last
Great Northern Paper Co.	43½	41⅛	41⅛
Hummel Ross Fibre Corp.	32¾	31½	31¾
St. Regis Paper Co.	10¾	10⅛	10¼
Taggart Corp.	9⅛	8⅛	9

BONDS

American Writing Paper Co. 6s '61	....	....	....



for End Labels

Whatever your product, your label *should* do a big job. And you can be sure that it does that job right when it is coated with Monsanto's heat sealing hot melt coating.

For example, on the end labels for specialty breads, Monsanto's heat sealing hot melt coating does an especially important job:

1. Ends of the wrapper effectively sealed
2. A clean, quick labeling operation
3. Labels positioned for most effective display
4. Eliminates expensive and unsatisfactory inserts, bands and glued labels
5. Provides a method for quick label changes, making coding and dating simple
6. An opportunity for a colorful, salesmaking message

You can get these same labeling advantages for your product. This special plastic coating will make your label stick to cellophane, waxed paper, glassine, acetate or foil. You can count on maximum labeling efficiency and economy by using labels coated with Monsanto's heat sealing hot melt coating.

Ask your label supplier for complete information, or write direct to: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Massachusetts. In Canada, Monsanto Ltd., Montreal, Toronto, Vancouver.

Frozen Prices Cut American Can Net

NEW YORK — American Can Company had net sales of $258,065,461 in 1946, the highest for any year except 1941, and net income after taxes of $8,828,983 equal after preferred dividends to $2.40 a share on 2,473,998 common shares outstanding, according to the annual report mailed to stockholders recently. The sales figure was virtually unaffected by the inflationary trend of the times, D. W. Figgis observed in the president's letter, since the company's prices on metal containers were frozen throughout the year by OPA ceilings and by term contracts. The gain which was 6.5 per cent over 1945, he said, represented an actual increase in units of production and sales. Earnings, while exceeding mid-year estimates by a considerable margin, were lower than the 1945 net after taxes of $13,341,614, or $4.23 a common share, because of frozen prices and increased expense, he pointed out.

Discussing the relationship between 1946 costs and profits, Mr. Figgis said:

"At the time prices were frozen by OPA in 1942, the company had made no adjustments for increased labor costs against basic prices established in 1936 or earlier. Prior to the war, constant improvement of facilities and production methods and development of new sales volume had made it possible to maintain a fair profit without such price adjustments. The greatest advances in labor costs, however, have occurred since the inception of OPA ceilings serving constantly to narrow the margins between costs and selling prices. This trend became most acute, of course, after the general wage advances of 1946 which brought the federal labor index to 152 per cent of 1941 and 200 per cent of 1936, eliminating all possibility of normal industrial profits under former price structures."

The company's capital expenditures for 1946 amounted to $24,584,528, compared with $10,383,493 in 1945. This increase, Mr. Figgis said, reflected substantial progress—as a result of the improvement in availability of materials for building and machinery—in important replacements and expansion of equipment and facilities which had not been possible during the war years.

In regard to the outlook for 1947, Mr. Figgis said, "there seem to be many sound reasons for an optimistic view. We face the greatest demand for our products that we have ever known. Our productive capacity is ample for utilization of all available materials. New price structures (effective January 1, 1947) which take into account much of the increased cost that had to be absorbed under the ceiling price program should permit a reasonable margin of profit."

There is every indication that, barring work stoppages which would reduce the total of available materials, Mr. Figgis continued, the company's sales should reach a new high point during 1947. Facing this probable new high in demand for its products, he said, the company ended the year 1946 with the lowest inventory in six years, amounting to $51,882,440, compared with $56,742,716 in 1945.

Certain-teed Products Reports Its Income Up

CHICAGO — Certain-teed Products Corporation last week reported 1946 net income of $4,323,269, equal to $2.62 a common share based on preliminary figures. This total compares with $1,353,303 or 79 cents a share in the preceding year. The 1946 earnings are before setting aside a contingency reserve of $383,324. The reserve fund, it is reported, now stands at $1,000,233. Sales last year amounted to $34,959,302, a 40 percent increase from $24,311,363 the preceding year.

Brown Staff Turns Out In Full Force

NEW YORK — During paper week, Brown Company's pulp division will be represented at the convention by Newton L. Nourse, pulp sales manager, and the following: John J. McDonald, Milton A. Hescock, William A. Gilman, H. S. Chellis, L. M. Cushing, H. G. Spear and C. R. P. Cash. At the Waldorf-Astoria, attending for the Paper and Towel Divisions, will be Gilford Henderson, sales manager of the Divisions, Harold Moley and William La Rose.

Finch, Pruyn Meets and Elects Directors

GLENS FALLS, N. Y. — The annual meeting of stockholders of Finch, Pruyn & Company was held recently at which officers and directors for the ensuing year were chosen. Among the re-elected directors are Maurice Hoopes, Louis P. Brown, Harold F. Bullard, Samuel Pruyn, Fred E. Chapman, Helen E. Foulds, Nellie M. Howe and Lyman A. Beeman. Officers elected include Maurice Hoopes, president; Lyman A. Beeman, Samuel Pruyn and Harold F. Bullard, vice presidents; Fred E. Chapman, treasurer, and Harold F. Bullard, secretary.

Kimberly and Niagara Mills Now on $1 an Hour Basis

KIMBERLY, Wis.—A five-cent hourly increase for all hourly paid workers at the Kimberly and Niagara, Wis., mills of Kimberly-Clark Corporation has been granted, according to George Truscott, president of the Papermill Workers Union. The base rate for male workers now is $1 an hour. The increase became effective February 10.

Competition Is Blamed For High Spot Prices

(Continued from page 7)

"ANPA members realize that the attainment of the objectives outlined may involve some diversions of Canadian shipments from ANPA members to other publishers who are in distress, but ANPA members desire Canadian mills to do their utmost to maintain supplies for merchants supplying newspapers and small consumers."

A few days earlier the association had found an increasing number of publishers displaying concern over rumors of prices running up to and more than $200 per ton for spot market newsprint said to be paid by some newspapers.

"In several instances," said ANPA, "publishers are being quoted to this effect: 'I can make money on this newsprint at $180 or $190 or $215.' Well informed publishers are disturbed because such a statement would lead newsprint manufacturers to believe that the daily newspaper business could survive at such fantastic prices for newsprint. In exceptional cases, it may be true that certain publishers can pay these astronomic prices for newsprint provided it is used for advertising only and costs calculated on the basis of paper and composition only, without regard to all other costs inherent in newspaper publication.

"Many publishers express the opinion that a price higher than the present price of newsprint would have serious effect on the ability of a large number of newspapers to continue in business. Therefore, publishers paying these fantastic spot market newsprint prices are believed by many to be contributing to a situation that could bring about an increase in the present contract price of newsprint.

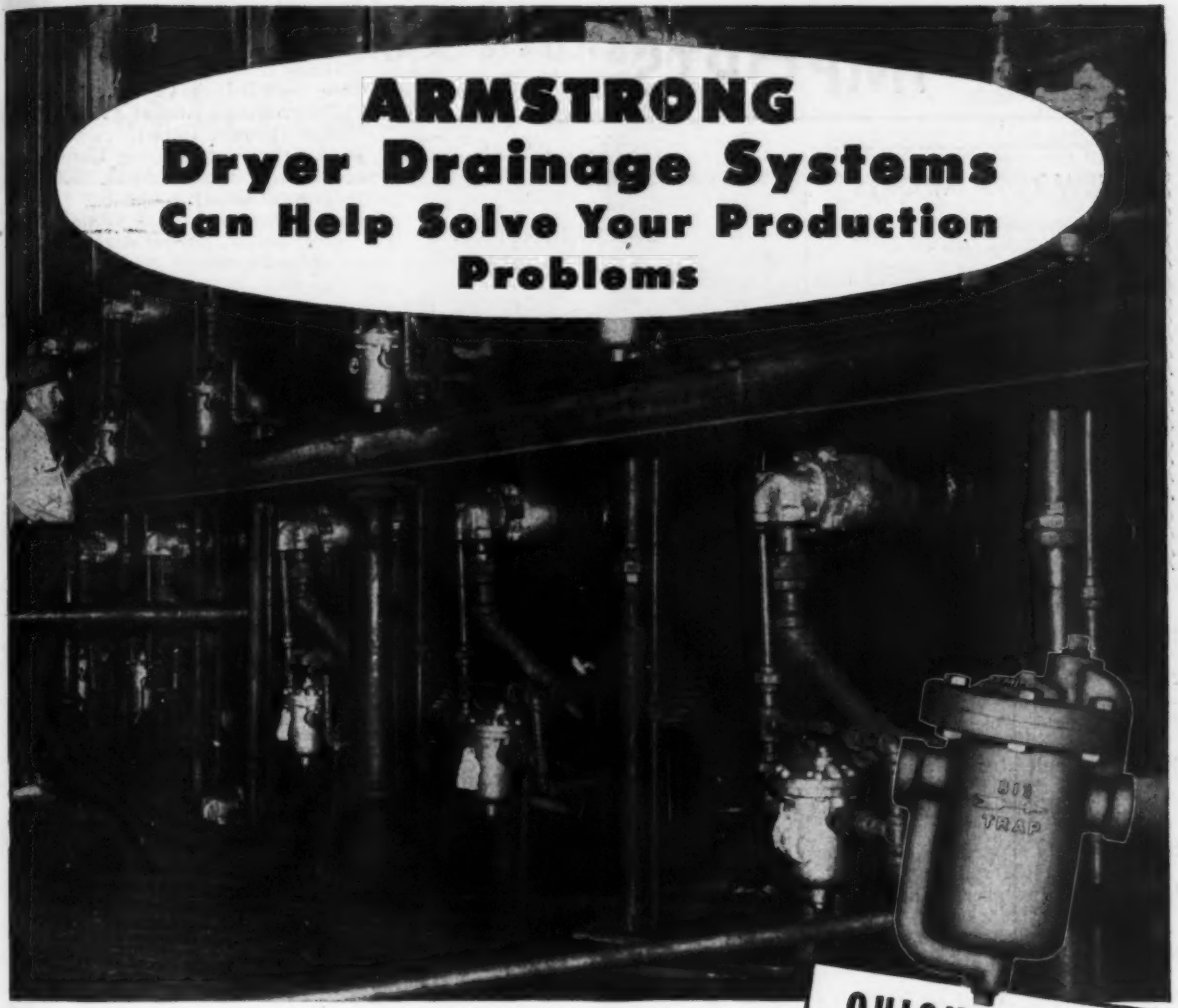
"So long as some publishers are willing to pay these fantastic prices some sales will be made. It is believed that a very small amount of tonnage is involved but these bids by one publisher against another are holding up the level of exorbitant prices which includes a considerable sum to go to the fixer or go-between.

"Based on reports of daily newspapers to the American Newspaper Publishers Association it is estimated that 364,961 tons of newsprint paper was consumed by all users in the United States during January.

"Daily newspapers reporting to the ANPA consumed 266,422 tons in January 1947, compared with 221,054 tons in 1946 and 229,799 tons in 1941.

"At the end of January 1947, daily newspapers reporting to the ANPA had stocks of newsprint paper on hand amounting to 36 days which is an increase of five days supply over 31 days at the end of December, 1946. This 36 days supply at the end of January 1947 compared with 39 days at the end of January 1946; 54 days at the end of January 1945 and 45 days at the end of January 1941."

ARMSTRONG
Dryer Drainage Systems
Can Help Solve Your Production Problems



IF you have veteran paper machines that are not coming close to modern standards for production, it will pay you to get up-to-date engineering recommendations from Armstrong. Armstrong Dryer Drainage Systems can be applied to existing machines at moderate cost and with minimum interruption in work schedules. Every Armstrong installation is sold subject to the user's complete satisfaction. Present customers report ability to use higher machine speeds and more uniform operating conditions — thanks to improved drainage of dryers with Armstrong Systems. We will be glad to make recommendations to meet your needs. Write to

ARMSTRONG MACHINE WORKS
818 Hoffman St., Three Rivers, Michigan

QUICK FACTS

- **SPECIAL DESIGN.** Armstrong has designed a trap to meet the special requirements of draining individual paper machine dryers.
- **BIG AIR HANDLING CAPACITY.** Vents air from cold dryers; continues to purge air from hot dryers.
- **FACILITATES PRESSURE CONTROL.** Provides a definite stopping point for live steam; permits accurate control of steam pressure (and temperature) in each dryer.
- **TROUBLE-FREE PERFORMANCE.** Very simple construction. All stainless steel mechanism of same design and construction used in forged steel traps for 1500 p.s.i. and 900°F.
- **LONG LIFE—LOW MAINTENANCE.** Where ordinary traps wear out rapidly on paper machine service, the specially designed Armstrong trap has demonstrated ability to stay on the job with no more maintenance than for ordinary service.

Inverted Bucket Steam Traps for Every Paper Mill Requirement

ARMSTRONG STEAM TRAP

Dryer Drainage System Trapping and Engineering

IMPORTS

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 15, 1947

SUMMARY

Newsprint	12,929 rolls
Wall Paper	5 cs.
Painted Paper	10 cs.
Coated Paper	82 cs.
Drawing Paper	1 cs.
Filter Paper	15 cs.
Twisting Paper	25 rolls
Wrapping Paper	247 rolls, 9 cs.
Cardboard	9 rolls
Boxboard	106 bls., 89 rolls
Miscellaneous Paper	1 bl., 21 cs.

NEWSPRINT

N. Y. Journal American, Markland, Liverpool, N. S., 937 rolls.
N. Y. Tribune, Markland, Liverpool, N. S., 1735 rolls.
N. Y. World Telegram, Markland, Liverpool, N. S., 758 rolls.
Brooklyn Eagle, Inc., Markland, Liverpool, N. S., 733 rolls.
Herald Statesman, Inc., Markland, Liverpool, N. S., 43 rolls.
Sydney S. Hoffman, Markland, Liverpool, N. S., 172 rolls.
Richmond Newspapers, Inc., (Richmond, Va.), Markland, Liverpool, N. S., 1878 rolls.
N. Y. Times, Bell Park, St. Johns, N. F., 1282 rolls.
Madden Reeve Angel & Co., Inc., Notre Dame Victory, Helsingfors, 483 rolls.
Bowater Paper Co., Cornerbrook, Cornerbrook, N. F., 3335 rolls.
Times-Herald, Rockliffe Park, St. Johns, 1483 rolls.
Madden Reeve Angel & Co., Inc., Uddeholm, Helsingfors, 90 rolls.

WALLPAPER

The T. Eaton Co., Gripsholm, Gothenburg, 2 cs.
American Express Cp/. Avranches, Havre, 3 cs.

PAINTED PAPER

All Transport, Inc., Avranches, Havre, 10 cs.

COATED PAPER

F. P. Gaskell, Elysia, Glasgow, 82 cs. (for cigarette tipping).

DRAWING PAPER

Stevens Nelson Paper Corp., American Traveler, London, 1 cs.

FILTER PAPER

E. H. Sargent, Gripsholm, Gothenburg, 14 cs.
Stevens Nelson Paper Corp., American Traveler, London, 1 cs.

TWISTING PAPER

Whitehall Shipping Co., Gripsholm, Gothenburg, 25 rolls.

WRAPPING PAPER

Crepe-Kraft Co., Gripsholm, Gothenburg, 173 rolls.
Jay Madden Corp., Uddeholm, Helsingfors, 74 rolls.
Meadows Wye & Co., American Traveler, London, 9 cs. (waxed).

CARDBOARD

F. Henjes, Jr., Gripsholm, Gothenburg, 9 rolls (bleached).

BOXBOARD

Jay Madden Corp., Uddeholm, Helsingfors, 106 bls., 89 rolls (folding).

MISCELLANEOUS PAPER

Corn Products Refining Co., Bolivia, Copenhagen, 1 bl. (sample).
E. Dietzgen & Co., Avranches, Bordeaux, 21 cs.

RAGS, BAGGINGS, ETC.

Harold Leonard & Co., Inc., Gainesville Victory, Antwerp, 16 bls. wiping cloths.
E. J. Keller Co., Inc., Gainesville Victory, Antwerp, 227 bls. rags.
A. W. Fenton, Exchange, Alexandria, 26 bls. rags, 145 bls. old cotton rags, 66 bls. new cotton cuttings.
Irving Trust Co., Exchange, Alexandria, 116 bls. old light hessian bagging.
Continental Bank Trust Co., Exchange, Alexandria, 88 bls. hessian tares.
E. J. Keller Co., Inc., Exchange, Alexandria, 100 bls. hessian rags.
National City Bank, Exchange, Alexandria, 112 bls. hessian rags.
Amicale Trading Co., Exchange, Genoa, 48 bls. old dark cottons.
A. W. Fenton, Exchange, Genoa, 21 bls. rags.
Continental Bank Trust Co., Exchange, Genoa, 53 bls. dark cotton rags.
(———), Exchange, Genoa, 3 bls. dark cotton rags.
Lush Cotton Products Co., La Pampa, Calcutta, 200 bls. cotton waste.
(———), La Pampa, Calcutta, 900 bls. old hemp strings and cloth.
National City Bank, La Pampa, Calcutta, 419 bls. old hemp rope cuttings.
(———), Elysia, Glasgow, 22 bls. new olive green denims, 135 bls. new hessian scrim, 61 bls. colored cotton rags.
1st National Bank, Barnard Victory, Antwerp, 58 bls. old bagging.
Cowa Co., Thistlemuir, Pernambuco, 132 bls. cotton waste.
(———), Mesh Knot, Vera Cruz, 55 bls. cotton rags.

CASEIN

Colloids Inc., Fort Columbus, Buenos Aires, 1000 bags (lactic).
Mercantile Metal & Ore Corp., Fort Columbus, Buenos Aires, 2400 bags (lactic).
American British Chemical Supplies, Mormacstar, Buenos Aires, 100 bags (ground lactic).
J. H. Schroeder Banking Corp., Mormacstar, Buenos Aires, 500 bags (ground lactic).
E. M. Sergeant Pulp & Chemical Co., Mormacstar, Buenos Aires, 100 bags (ground lactic).

BONE GLUE

Transatlantic Animal By-Products Corp., Fort Columbus, Santos, 223 bags.

WOODPULP

Pulp Sales Corp., Notre Dame Victory, Helsingfors, 11,596 bls. prime unbleached kraft sulphate pulp, 2319 tons; 1965 bls. prime unbleached sulphite pulp, 393 tons.
Pulp Sales Corp., Notre Dame Victory, Mantyluoto, 475 bls. prime bleached strong sulphite pulp, 78 tons; 255 bls. prime unbleached kraft sulphate pulp, 51 tons.
The Borregaard Co., Inc., Gripsholm, Gothenburg, 153 bls. dry chemical pulp.
Parsons & Whittemore, Inc., Gripsholm, Gothenburg, 281 bls. dry sulphite pulp.
C. G. Johnston Co., Gripsholm, Gothenburg, 6 crates ethylated woodpulp.
Pulp Sales Corp., Uddeholm, Helsingfors, 750 bls. prime unbleached strong sulphite pulp; 260 bls. prime extra strong sulphite pulp; 315 bls. prime unbleached sulphite pulp; 704 bls. unbleached sulphite pulp.

WOODPULP BOARDS

Jay Madden Corp., Uddeholm, Helsingfors, 1714 rolls, 262 bls.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 15, 1947

Pulp Sales Corp., Notre Dame Victory, Helsingfors, 1150 bls. prime unbleached sulphite pulp, 201 tons.
Madden Reeve Angel & Co., Inc., Notre Dame Victory, Helsingfors, 762 rolls newsprint.
Jay Madden Corp., Notre Dame Victory, Helsingfors, 663 rolls wrapping paper.
Pulp Sales Corp., Notre Dame Victory, Mantyluoto, 1858 bls. prime unbleached extra strong sulphite pulp, 371 tons; 2379 bls. prime unbleached kraft sulphate pulp, 475 tons; 2020 bls. prime unbleached sulphite pulp, 404 tons.
Bank of New York, Exchange, Genoa, 72 bls. old dark cotton rags.
Bowater Paper Co., Cornerbrook, Cornerbrook, N. F., 4470 rolls newsprint.
Price & Pierce, Ltd., Uddeholm, Wallvik, 20,820 bls. sulphite pulp.
Madden Reeve Angel & Co., Inc., Uddeholm, Helsingfors, 1290 rolls newsprint.
Pulp Sales Corp., Uddeholm, Helsingfors, 1500 bls. prime unbleached strong sulphite pulp; 1016 bls. white dry ground woodpulp.

American Envelope's Moraine Mill To be in Production By Fall

WEST CARROLLTON, Ohio—The new paper mill now under construction for the American Envelope Company in this city is rapidly taking shape. It will be known as the Moraine Paper Company Division and its total cost, including land, buildings, and equipment will be approximately $3,000,000. The complete design and layout has been under the direct supervision of Frederic C. Clark, pulp and paper mill consulting engineer, 7 Dey Street, New York.

Construction work is in full progress and completion is expected so that manufacturing operations may be started in the early fall.

Carlton W. Smith, president of the American Envelope Company, in authorizing the start of this project, laid down certain definite specifications. He wanted a mill that was thoroughly modern in every detail, with the ability to produce paper of highest quality at maximum speeds and lowest cost; all operations were to be on one main floor built at truck and railroad car door level; the design was to allow for future expansion, if and when required, without sacrificing the streamline flow in the original design; a white water system that would use a minimum of water was to be provided; there was to be a minimum waste of fiber, thus conforming to the best practice in reducing stream pollution. Mr. Smith also emphasized his desire to combine the aesthetic with the utilitarian in the building design, both inside and out.

The site selected for this project was a flat field of some 85 acres bounded on one side by the Big Four Railroad, by paved highways on two sides, and by an open field. Future expansion has been provided for and the buildings have been so placed as to allow the eventual location of the envelope plant beside the paper mill and the construction of a suitable general office building. There are ample grounds for landscaping. The architectural details of the building have been under the supervision of W. Ray Yount, architect, of Dayton, Ohio.

The space requirements for the equipment in each department were studied and the layout so arranged as to require a minimum of labor for handling the incoming raw materials and their processing through the plant.

There are two buildings: the paper mill, 500 feet long by 330 feet wide, and the power house, 50 feet by 90 feet. The main building is windowless and is constructed of brick. The dark bands shown in the photograph are chocolate brown, the rest being buff. The inside walls will have a six foot high wainscot of smooth-surfaced, dark tan bricks, topped by a single row of black, glazed bricks. Above this there will be cream colored glazed tile to the roof line. The effect, both inside and out, will be simple, artistic, and pleasing to the eye, and the surfaces will be very easy to keep clean.

FREDERIC C. CLARK

A railroad track runs along the entire 500 foot length of the east side, with a spur serving the power plant.

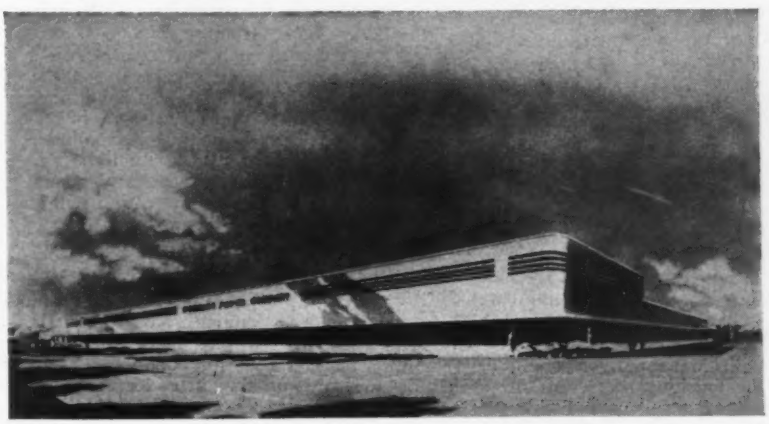
The paper mill has two sections: one is 500 feet by 240 feet and one story high; about half of this space is reserved for the storage of raw materials, process supplies, shop, and mill stores, the balance being devoted to the finishing room operations, the storage of finished paper, and shipping. The other section, which measures 500 feet by 90 feet, is the machine and stock preparation room. Here the roof trusses are 25 feet above the floor and there is a 15-ton crane of 89-foot span and 500-foot travel. A basement with 14-foot head room is beneath this area. Space has been provided for a second paper machine of 175 inch trim.

The mill has been designed so that material in process, from receiving dock to shipping platform, moves in one direction only and with a minimum of effort, using electric trucks and many other labor saving devices. The control office and laboratory are in the middle of the building in order to be near all control points.

The stock preparation equipment is being built by Shartle Bros. It will consist of a 16-foot Dilts Hydrapulper, which is set on the basement floor and projects about six inches above the main floor for ease in charging from a low conveyor, one round vertical tile chest for the storage of pulped broke, two tiled cycling chests, the tops of which are three feet above the main floor, two Shartle hydrafiners in the basement, but controlled from the main floor, and one tile machine chest which projects three feet above the main floor. All of this equipment will be electrically operated on the main floor from a control panel designed by Shartle, Foxboro and Westinghouse from plans developed by Mr. Clark and Herbert Brawn, mill superintendent.

Two Jordans will be on the machine room floor and will discharge into Bird screens which are set on a mezzanine floor in the basement. This brings the top of them at waist height on the main floor for convenience in operation by the machine tender. The stock will be pumped from the screens to the Bertram flow box. Every possible consideration has been given by Mr. Clark to the designing and planning of operations for the greatest simplicity and ease of control.

The paper machine is a Beloit removable type foundrinier being rebuilt by Sandy Hill Iron and Brass Works. It will have a wire 132 inches by 80 feet and will have ample fin and cylindrical table rolls for high speed. Oscillating suction boxes will be provided. There will be a motor driven dandy roll, a suction couch roll, a suction first press, a plain second press, a plain third press which may be run "reverse" or "straight through," and a



The New Moraine Plant at West Carrolton, Ohio

smoothing press mounted on the sole plate. There will also be a first drier section of 36 paper and 4 felt driers of 48-inch diameter, a 2-roll breaker stack, a second section of driers of 12 48-inch paper and 2 36-inch felt driers, a size press, a third drier section of 8 48-inch driers, 2 calender stacks of 9 rolls each, an English reel, and a Cameron winder. The machine is completely equipped from couch to reel with air jets and rope carrier.

The paper machine is driven by a 450 horsepower Westinghouse turbine, direct connected to a Sandy Hill backline drive on the main floor, and is sufficient for speeds up to 1000 feet. The ultimate capacity of the paper machine on 20 pound folio at 1000 feet per minute will be 9000 pounds per hour, or about 100 tons a day.

The hood for the paper machine and the machine room ventilating system will be supplied by J. O. Ross Engineering Company. They propose to blow in about 200,000 cfm of air and to evacuate an equal amount through the paper machine hood. Some of the air will be introduced into the basement where it will be cooled in summer and heated in winter to prevent roof condensation. Part of this basement air will be blown up around the driers, and part will be discharged through floor ducts at the dry and wet ends of the machine to give good ventilation for the machine operators.

The ceiling of the machine and stock preparation room is covered by half-inch Transite sheets, made by the Johns-Manville Company, on steel purlines, with two inches of poured gypsum and one inch of mineral wool, above all being covered with tarred and graveled six-ply roofing. The roof will have a thermal conductivity of .081. This low value, with the air supplied by the Ross ventilating system, should eliminate condensation under any weather condition encountered in this area.

The finishing room, which is beside the machine room, will be 100 feet by 220 feet, with 14-foot head room under the roof trusses. This area will be completely air conditioned for the comfort of employees and to maintain a uniform moisture content in the paper. The equipment will be supplied by Surface Combustion Company.

The air conditioning unit will supply 40,000 cubic feet of conditioned air per minute with an eleven-minute air change. The temperature is controlled by heating and cooling coils. The relative humidity control takes place within a Lathabar absorption system in which the air passes through a spray chamber where it comes in contact with lithium chloride. The temperature of the lithium chloride controls the degree of dehumidification.

There will be one 84-inch high speed Hamblett cutter and lay-boy equipped with Maxson overlapping delivery in the finishing room. Mr. Clark has designed a special movable platform on which two 12-roll back-stands, mounted side by side, are placed. One back-stand will be loaded while the other is in the running-off position. After the first set is run off, the platform will be turned around so that the second back-stand will be in the run-off position and the first one will be in the loading position. This scheme will eliminate the time that is lost in loading rolls of paper in the usual manner.

Space has been provided so that paper from the cutter will be stored on skids, then moved straight ahead to the sorters, counters, trimmers, and packers. Scales have been provided for weighing paper and broke at all stages of the process for cost accounting purposes. George A. Ware, cost engineer for the American Paper and Pulp Association, New York City, has been in charge of establishing a cost system with the necessary stations for accurate and complete control.

Storage of finished and packaged paper will be next to the finishing room in a space 140 feet by 220 feet with 14-foot head room under the roof trusses. A truck and railroad loading platform ten feet wide will be provided on two sides of the shipping room for four trucks and five railroad cars. The platform is covered with a canopy along its entire length.

James E. Branson, consulting engineer of Cincinnati, Ohio, is in charge of the design and detailed layout of the power plant, which covers a ground area of 50 feet by 90 feet. Pumps and auxiliary equipment are on the first floor; the second floor will be used for operating. The power unit will be a 450 pound Babcock & Wilcox integral furnace boiler with a capacity of 80,000 pounds of steam per hour. A Westinghouse multiple retort underfeed stoker will be used. The turbine and generator unit of 3000 Kw. at 2400 volts is being supplied by Westinghouse Electric Corporation. The turbine will bleed off at 35 p.s.i. for the paper machine driers, heating, and process steam. Ample condenser capacity has been provided. The boiler is fully equipped with superheater, economizer, and Bailey combustion control and meters.

Coal will be discharged from cars into a track hopper and carried by bucket and belt conveyors to a cylindrical bunker overhead, then fed by gravity through a Stoch automatic weighing and recording scale and through a distributing spout to the stoker hopper. The ash handling equipment will be furnished by United Conveyor Company. A cooling tower for condenser water will be supplied by Lilie-Hoffman Cooling Towers, Inc. The Cochrane Corporation will supply the treating system.

Egan Company Moves

BOUND BROOK, N. J. — Frank W. Egan & Company have taken the entire floor of 108 Hamilton Street for their engineering and office staff, already in the new location. Sidney Taylor of Cranbury, and Fred Soloduk of New Brunswick, have become members of the engineering staff.

Stainless-Clad Steel Added to Lukens Line

COATESVILLE, Pa.—Manufacture of a complete line of stainless-clad steels by Lukens Steel Company, of this town, rounds out a line of industrial steels which was started seventeen years ago when Lukens began the production of its first clad metal, nickel-clad steel. Other clad steels, Inconel-clad and Monel-clad, were later developed by Lukens.

In the Lukens method of manufacturing stainless-clad steels, a light layer of the proper type of solid stainless steel is bonded to a backing plate of carbon or low alloy steel. The Lukens process insures uniformity of cladding thickness and a permanent bond between the stainless steel and the backing plate.

Stainless steels of types 304, 316, 347, 410 and 430 are the cladding materials generally used. They are declared to offer the corrosion resistance and product protection of solid stainless steel, at appreciable savings in material cost over solid stainless. In addition, Lukens asserts they have far superior heat conductivity to solid stainless steels and are readily fabricated.

Lukens stainless-clad steels are promised to exceed the minimum shear strength requirements of the ASME Code of 20,000 psi. The ASME Code permits the cladding to be included in the full thickness for many applications. The cladding is usually 10 percent of total plate thickness, although any percentage from 5 percent up to 50 percent can be obtained. Specifications of both the stainless and the backing plate may be widely varied to meet chemical and physical requirements.

Lukens Stainless-Clad Steels are furnished in plates from 3/16 to more than 3 inches thick; or up to 162 inches wide; and also in heads of all styles and sizes to over 18 feet in diameter.

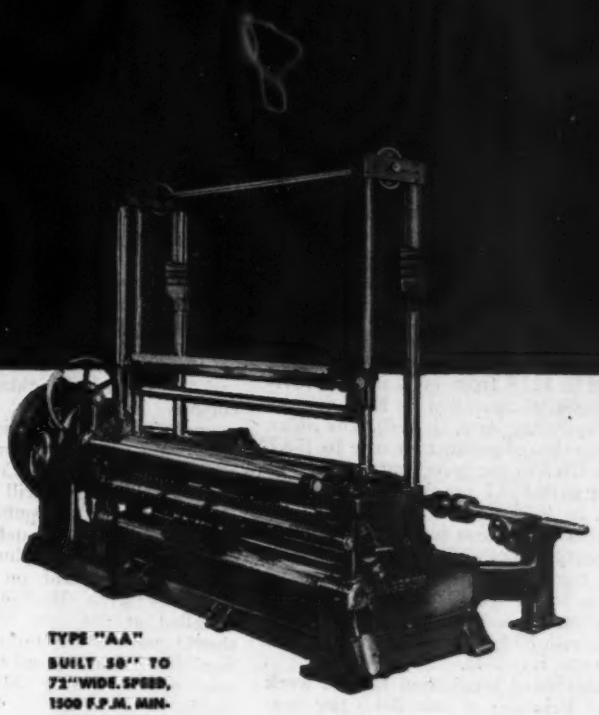
Lukens Stainless-Clad Steels are expected to have wide use in equipment for processing food products, paper, petroleum, pharmaceutical, synthetic resins and plastics, and organic compounds as well as for equipment handling chemicals, such as sulfuric, nitric and mixed acids.

Rust Builds Bag Plant For Arkell & Smiths

MOBILE, Ala. — The Rust Engineering Company, Pittsburgh, Pa., is building a modern bag plant here for Arkell and Smiths of Canajoharie, N. Y. Designed by Rust, the brick and steel building will be fire resistant and will include a manufacturing area and air-conditioned office space. The entire building is being equipped with a sprinkler system. The manufacturing area and office will be equipped with fluorescent lighting.

A CLEAN CUT • A SHEAR CUT

LANGSTON



TYPE "AA"
BUILT 58" TO 72" WIDE. SPEED, 1500 F.P.M. MINIMUM CUT 3/4"

LONG-PLANNED IMPROVEMENTS ARE NOW AVAILABLE IN LANGSTON SLITTERS AND ROLL WINDERS. NEW MOUNTING AND ADJUSTMENT OF THE SLITTER ELEMENTS FOR INSTANCE, GREATLY REDUCE THREAD-UP TIME; PERMIT UNIFORM ADJUSTMENT OF ALL BLADES. SLITTER LIFE IS EXTENDED — MAINTENANCE AND DOWN TIME CONSIDERABLY REDUCED.

WHEREVER PAPER IS PROCESSED; IN THE MILL, THE FINISHING ROOM, OR THE CONVERTING PLANT — LANGSTON SLITTERS AND ROLL WINDERS ASSURE DEPENDABLE, TROUBLE-FREE SERVICE.

SAMUEL M. LANGSTON CO., CAMDEN, NEW JERSEY

SLITTERS AND ROLL WINDERS

TRENDS

Office of the PAPER TRADE JOURNAL, Wednesday, February 19, 1947.

Imports of book paper from the Netherlands, and groundwood printing paper from Finland together with a large increase in the tonnage of kraft paper coming from Finland are indications of the revived ability of foreign mills to ship paper to the American market, according to Warren B. Bullock, Manager of the Import Committee of the American Paper Industry.

The index of general business activity for the week ended February 8 declined to 143.8 from 147.6 in the previous week, compared with 112.5 for the corresponding week in 1946. The index of paperboard production rose to 178.7 from 176.7 in the preceding week, compared with 150.1 for the corresponding week in 1946.

Paper production for the week ended February 8 was estimated at 106.2 per cent, compared with 104.0 for the preceding week, with 99.7 for the corresponding week in 1946, with 90.1 for 1945, with 89.6 for 1944, and with 88.4 per cent for 1943.

Paperboard production for the week ended February 8 was 104.0 per cent of capacity, compared with 102.0 per cent for the preceding week, with 97.0 for the corresponding week in 1946, with 93.0 for 1945, with 97.0 for 1944, and with 87.0 per cent for the corresponding week in 1943.

Alaskan Newsprint

Alaska can produce one-fourth the newsprint that the United States currently consumes and the United States Forest Service is interested in helping her to do so, according to Frank Heintzleman, regional forester of Juneau. Mr. Heintzleman has temporarily cast aside his Alaskan duties in order to talk up the pulp and paper possibilities of the Territory. After having spent twenty-eight years in the region, familiarizing himself with every phase of forest control, he is convinced that Alaska pulp and paper mills could compete on a commercial basis with the mills of Canada, Newfoundland and other areas.

The Forest Service is primarily interested in the development of the 80,000,000,000 board feet of spruce, hemlock, and other commercial timber in Southeastern Alaska for pulp and paper purposes. It is believed that Southeastern Alaska could produce 3,500 tons of newsprint a day in perpetuity, more than one-fourth the rate of consumption in the United States. Thus far, however, private industry has maintained that the climate is too damp for successful operations; that labor costs are too high; that freight rates are too high; and that no private commercial company could afford to operate under the conditions set forth by the Interior Department.

Sales of San-Nap-Pak Manufacturing Co., Inc., traded over the counter, are expected to be in excess of $8 million for 1946, compared with a volume of $5.6 million in 1945. Easing of the tight pulp situation has permitted a higher rate of activity in recent weeks and operations currently are understood to be at a $10 million annual rate. Between 80 and 85 percent of the firm's business is in the manufacture of facial tissues. San-Nap-Pak has been operating two plants, one at Wheelwright, Mass., and a second at Rockland, Del. The company recently took the first step toward further integration of its business through acquisition of the Mt. Tom Sulphite Pulp Co., in Massachusetts. This unit will supply a substantial part of the pulp needs at the Wheelwright plant and provide the company with a surplus of pulp for the Rockland plant on contracts already operative. Machinery now being installed at the new Mt. Tom plant should make a substantial increase in San-Nap-Pak's over-all tissue capacity, now approximating 30,000 tons annually.

Wood Pulp

While pulpwood and waste paper receipts as well as domestic wood pulp production continues at a very satisfactory level, market wood pulp supplies remain tight. Imports of overseas pulp over a period of many weeks have averaged only about 30,000 tons a month. With consumption of overseas pulp ranging around 60,000 tons a month, it is obvious that current receipts not alone fail to meet current consumption but also fail to allow for inventory accumulation before frozen northern European ports will not allow much volume of pulp to be moved. Thus, it looks as though many pulp purchasing paper mills will be directly squeezed long before spring shipments from overseas are resumed.

Rags

Demand for new domestic cotton-cuttings remains strong with prices firm at recent high levels. Some activity has been reported for white back blue overalls at $8.25 per 100 pounds delivered to paper mills plus dealer's commission. Cottonades remain $4.50 to $5; while unbleached muslin and white shirt cuttings continue at $11.50 to $12.

In the old foreign rag market activity is reported for checks and blues at $4 to $4.25; and linsey garments at $4.50 to $5 per 100 pounds f.o.b. New York.

Old Rope and Bagging

Domestic gunny this week was reported at $4.25 per 100 pounds f.o.b. New York; while heavy wool tares were offered nearer the $5 level. Bright bagging continued at $4.25 to $4.50.

Foreign Manila rope offerings are reported to be maintaining their 7.00c level; while domestic Manila hovers around the 5.75c mark. Jute and sisal remain firm at prevailing levels.

Waste Paper

Indications are that paper mills will maintain their current level of waste paper buying through next month after which they intend to avoid accumulations at present high prices; especially the inferior grades.

Otherwise there is very little change in the waste paper market. No. 1 heavy books and magazines are strong at $45 to mills, baled, f.o.b. New York. White blank news at $75 to $80 showed more strength this week as did No. 1 ledger at $70 to $80.

Pacific Mills Ltd. Starts Its Own Quarterly Magazine

VANCOUVER, B. C. — A quarterly magazine by and for the people of Pacific Mills Limited and its subsidiary companies made its first appearance with a snappy January issue. In the foreword to this first number, P. E. Cooper, president of the company, said, *"Paper People* is our new magazine, and is intended to interest and inform not only our own vast family of employees throughout western Canada, but also our friends and customers in Canada and abroad."

Editor George Cameron Stockland is to be congratulated for getting up such a fine publication right from the start. Included in this first number were a brief historical review of Pacific Mills Limited; two morale-building success stories of PM men who worked their way up the ladder; a resume of a management conference; notes on new subsidiaries; several feature stories covering such topics as the colorful story of J. R. Morgan a 54-year-old steam tug, to What the Pulp and Paper Industry means to Canadians.

Portal Suit Filed Against Brown Co.

CONCORD, N. H.—In the first portal-to-portal pay suit recorded in New Hampshire, the Brown Co. of Berlin, a paper products manufacturing firm has been charged with failure to pay overtime wages amounting to $250,000. The United Mine Workers (CIO) charged the company with failure to pay some 1600 workers for overtime in preparing for work and for wash periods after work.

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume of business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Roll, contract ....$84.00 @ —
Sheets .....103.00 @ —

Kraft—per cwt.—Carload Quantities
Zone A, Delivered
40 lb. base weight

Superstandard Wrapping	$6.25	@	$6.50
No. 1 Wrapping.	6.00	"	6.25
Standard Wrapping	5.25	"	6.00
Standard Bag ...	5.25	"	6.00

Tissues—Per Ream 24x36 (480) 10 lb. Zone 1.

Wh. No. 1 Frd. ...	1.10	@	1.20
Wh. No. 1 M. G. ..	1.10	@	1.20
Wh. No. 1½	.95	@	1.10
Wh. No. 2	1.00	@	1.10
Wh. Anti-Tar.	2.25	@	3.50
Kraft Unbl.	1.15	@	1.25
Manila No. 2	.90	@	1.05

Toilet—Per Case of 100 rolls 1 M Sheets.

Unbleached	4.47	@	5.50
Bleached	6.50	@	—

Paper Towels — Per Case of 3750 Zone 1.

Wh. C. fold 11x13¾	4.00	@	—
Br. Sgl. fold 10 in.	2.37	"	2.48
Br. M'ltf'd 9¼x14⅜	3.48	"	—
Br. M'ltf'd 9¼x9¾	2.37	"	2.48

Manila—per cwt.—C. l. f. a.

No. 1 Jute 11.25	@	—	
No. 1 Manila 35 lb.	6.00	"	7.00

Boards, per ton—

News *70.00	@	75.00	
Chip *67.50	"	73.00	
Sgl. Mla. Li Chip*80.00	"	89.00	
White Pat. Coated*86.00	"	101.50	
Kraft Liners 42 lb.*84.00	"	100.00	
Binders Boards .. 94.00	"	126.00	

Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—
White, Assorted Items

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.75 @ $46.75		$40.90 @ $48.00	
100% Rag.	32.85	" 38.50	34.00	" 40.00
85% Rag	....	"	30.55	" 38.75
75% Rag	24.30	" 28.50	24.45	" 30.00
65% Rag	....	"	....	" ....
50% Rag	20.05	" 24.50	21.25	" 25.75
25% Rag	17.85	" 21.75	19.00	" 23.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers..
White, Assorted Items

	Bonds		Ledgers	
No. 1	$12.00 @ $14.50		$13.15 @ $16.00	
No. 2	11.25	" 13.75	12.25	" 15.00
No. 3	....	"	....	" ....
No. 4	10.60	" 13.00	11.75	" 14.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—
White, Cased Paper

No. 1 Glossy Coated..	$14.70 @ $16.75		
No. 2 Glossy Coated..	13.75	" 15.50	
No. 3 Glossy Coated..	13.20	" 14.00	
No. 4 Glossy Coated..	12.90	" 14.50	
No. 1 Antique (Watermarked)	11.35	" 12.75	
No. 2 Offset	10.65	" 12.25	
A Grade E. F.	10.60	" 12.00	
A Grade S. & S. C. ..	11.00	" 12.50	
B Grade E. F.	10.30	" 11.75	
B Grade S. C.	10.70	" 12.25	
C Grade E. F.	10.00	" 11.50	
C Grade S. C.	10.40	" 12.00	
D Grade E. F.	9.70	" 11.00	
D Grade S. & S. C. ..	10.10	" 11.50	

Ivory & India at $.50 cwt. extra.

Wood Pulp

Domestic mill prices delivered with former OPA freight allowances.

	Per Short ton		ADT
Groundwood	$75.00	to	—
Unbleached Sulphite .	105.00	"	—
Bleached Sulphite ..	115.00	"	122.50
Bleached Soda	105.00	"	115.00
Unbleached Kraft ..	102.50	"	—
Southern Kraft	90.00	"	102.50

Canadian mill prices delivered with freight allowances of $7.50 per ADT; unless otherwise specified:

	Per Short ton		ADT
Regular Kraft $102.50	to	—	
Select Unbleached Kraft (no freight allowance)	105.00	"	—
Unbleached Sulphite..	105.00	"	—
Glassine Unbleached Sulphite (no freight allowance)	102.50	"	—
Bleached Soda	105.00	"	115.00
Groundwood	75.00	"	80.00
Sideruns Pulping News	75.00	"	—
Hardwood and Specialty Grades	Nominal		

Swedish wood pulp prices, per ton of 2,000 lbs. air dry weight on dock usual Atlantic and Gulf ports with an average freight cost of about $9.00 per short ton included. Subject to change as it is said these prices are not satisfactory to Swedish producers:

	Per Short ton	ADT
Bleached Sulphite	$130.00	
Bleached Kraft	126.00	
Unbleached Sulphite	95.00	
Unbleached Kraft	89.00	
Finnish quotations ex. dock, New York		
Bleached Sulphite	Per Short ton $165.00	ADT
Unbleached Sulphite	132.50	
Unbleached Sulphite (special grade)	137.50	
Unbleached Sulphate	132.50	
Unbleached Sulphate (special grade)	139.00	

Other European countries, at the present time, are not quoting on prompt and forward deliveries of wood pulp, because they have no tonnage available for export.

New Domestic Cotton Cuttings

(Prices delivered Mill Plus Dealer's Commission)

White Shirt .....$11.50 to	$12.00
Light Silesias	7.50
Unbleached Muslin ... 11.50 "	12.00
White Back Blue Overalls ..	8.25
Blue Overalls	7.75
Unbl. Fancy Shirt ... 4.50 "	5.00
Light Percales ..... 5.50 "	6.00
Light Prints ..... 5.25 "	5.95
Washables	4.00
Bleachable Khaki .... 5.50 "	6.00
Unbleachable Khaki .. 5.00 "	5.50
Cottonades ..... 4.50 "	5.00

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.	
No. 1 Whites Repacked ..	$5.00	
No. 1 Whites Miscellaneous	4.25	
No. 2 Whites Repacked ...	4.00	
No. 2 Whites Miscellaneous	3.50	
Blue Overalls	3.75	
Thirds and Blues Repacked	3.00	
Thirds and Blues Miscellaneous	2.50	
No. 1 Roofing Rags	2.20	
No. 2 Roofing Rags	2.10	
No. 3 Jute Bagging	2.00	
No. 4 Brussels and hard back carpets	2.00	
No. 5A Roofing Rags	2.00	

New Foreign Cotton Cuttings

(Prices delivered Mill)

	Per 100 lbs.		
New Dark Cuttings..	$6.00	to	....
New Mixed Cuttings	6.50	"	....
Light Silesias	9.00	"	10.00
Light Flannelettes ..	8.00	"	9.00
New White Cuttings..	13.00	"	15.00
Fancy Shirt Cuttings.	9.00	"	10.00
Light Prints	8.00	"	10.00
Bleachable Khaki, No. 1	7.00	"	7.50
Unbl. Khaki, No. 1..	6.25	"	6.75

Old Foreign Rags

(F.O.B. New York)

	Per 100 lbs.		
No. 1 White Linens ..	$14.00	to	16.00
No. 2 White Linens .	12.00	"	13.00
No. 3 White Linens .	8.00	"	9.00
No. 4 White Linens	8.00	"	9.00
No. 1 White Cottons	10.00	"	12.00
No. 2 White Cottons	8.00	"	9.00
No. 3 White Cottons	6.50	"	7.00
No. 4 White Cottons	5.00	"	5.50
Extra Light Prints...	7.50	"	8.00
No. 1 New Light Prints	6.25	"	6.75
Med. Light Prints ...	5.25	"	5.75
Dutch Blue Cottons ..	5.25	"	5.50
Checks and Blues ...	4.00	"	4.25
Linsey Garments	4.50	"	5.00
Dark Cottons	3.75	"	4.00
Old Shopperies	3.25	"	3.50
New Shopperies	3.25	"	3.50

BAGGING

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs.		
Foreign Gunny, No. 1	$4.75	to	5.00
Domestic Gunny, No. 1	4.25	"	4.50
Light Wool Tares....	4.50	"	4.75
Heavy Wool Tares ..	4.75	"	5.00
Bright Bagging	4.25	"	4.50
Foreign Manila Rope	6.00	"	7.00
Domestic Manila Rope	5.75	"	...
Jute Strings	4.50	"	5.00
No. 1 Sisal Strings ..	4.00	"	4.50
Mixed Strings	1.75	"	...

Waste Paper

Prices to Mills
(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut $100.00	@	$120.00	
No. 1 Hard White Envelope Cuts ...	90.00	"	100.00
No. 1 Hard White Shavings, unruled.	100.00	"	110.00
No. 1 Hard White Shavings, ruled ..	80.00	"	90.00
Soft White Shavings, one cut	95.00	"	105.00
No. 1 Soft White Shavings	85.00	"	95.00
Soft White Shavings, Misc.	65.00	"	75.00
No. 1 Fly Leaf Shavings	55.00	"	60.00
No. 2 Fly Leaf Shavings	50.00	"	55.00
No. 1 Groundwood Fly Leaf Shavings	30.00	"	33.00
No. 2 Mixed Groundwood Fly Leaf Shavings	(nominal)		
Mixed Colored Shavings	(nominal)		
Mixed Groundwood Colored Shavings.	(nominal)		
Overissue Magazines	(nominal)		
No. 1 Heavy Books & Magazines	40.00	"	45.00
Mixed Books	22.00	"	25.00
No. 1 White Ledger	70.00	"	80.00
No. 2 Mixed Ledger, colored	60.00	"	70.00
New Manila Envelope Cuttings, one cut.	100.00	"	110.00
New Manila Envelope Cuttings	65.00	"	75.00
Extra Manilas	40.00	"	45.00
Mixed Kraft, Env. & Bag Cuttings ...	75.00	"	85.00
Kraft Envelope Cuttings	100.00	"	105.00
Triple Sorted, No. 1 Brown Soft Kraft	70.00	"	75.00
New 100% Kraft Corrugated Cuttings..	70.00	"	75.00
No. 1 Assorted Old Kraft	40.00	"	50.00
New Jute Corrugated Cuttings	27.00	"	—
Old 100% Kraft Corrugated Containers	(nominal)		
No. 1 News	26.00	"	27.00
No. 1 Mixed Paper.	19.00	"	21.00
Box Board Cuttings	23.00	"	—
White Blank News.	75.00	"	80.00
Overissue News ...	(nominal)		
Old Corrugated ...	28.00	"	30.00
Mill Wrappers	23.00	"	25.00

Twines

All Prices Nominal
(F. o. b. Mill)
(Soft Fiber)

Coarse Polished—India	.26	@	.29
Fine Polished—Fine India	.31	"	.35
Unpolished—			
Paper Makers ...	.20	"	.26
Tube Rope	.22	"	.27¼
Wrapping	.26	"	.33½
Cotton	.70	"	—
(Hard Fiber)			
Mex. Sisal	.21	"	.24
Manila	.33	"	—
(Hemp)			
Polished Hemp	.63	"	—

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—	
New White No. 1.....	.07¼
New White No. 2.....	.05¾
Light Silesias	.05¾
Black Silesias, soft.....	.03¾
New Unbleached	.07½
Washable Prints	.04¾
Washable No. 1.....	.03
Blue Overall	.05½
Cottons—Acording to grades—	
Washable Shredding	.01¾
Fancy Percales	.04¾
New Black Soft.....	.03¾
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings..	.04¼
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1—Repacked	3.80	to	4.00
Mixed White	3.50	"	—
White No. 2—Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	2.50
Repacked	2.20	"	—
Roofing Stock—			
Foreign No. 1.....	1.85	"	—
Domestic No. 1....	1.75	"	—
Domestic No. 2....	1.65	"	—
Roofing Bagging ..	1.35	"	—
Old Manila Rope....	5.75	"	—

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1—Foreign	Nominal		
Domestic	3.00	to	3.50
No. 1 Clean Bright—Sisal Strings	.04	"	—
No. 2 Clean Bright—Sisal Strings	.03	"	—
Sisal Jute	.02½	"	.02¾
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.85
Wool Tares, heavy...	4.00	"	4.25

No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	@	$115.00
No. 1 Hard White Shavings, unruled.	100.00	"	—
Soft White Shavings, one cut	90.00	"	95.00
White Blank News	45.00	"	50.00
Soft White Shavings, Misc.	65.00	"	70.00
No. 1 White Ledger	52.00	"	55.00
No. 2 Ledger, colored	42.00	"	45.00
No. 1 Heavy Books & Magazines	38.50	"	40.00
Overissue Magazines	nominal		
New Manila Envelope Cuttings	65.00	"	75.00
No. 1 Assorted Old Kraft	40.00	"	—
No. 1 Mixed Paper	19.00	"	21.00
Box Board Cuttings	23.00	"	25.00
Kraft Corrugated Cuttings	nominal		
Old Corrugated	28.00	"	30.00
Overissue News	35.00	"	—
No. 1 News	26.00	"	30.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled.	7.00	@	8.00
No. 1 Hard White Shavings, ruled	7.00	"	8.00
Soft White Shavings, Mis.	6.25	"	6.50
No. 1 Fly Leaf Shavings	1.65	"	1.80
No. 2 Fly Leaf Shavings	2.00	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	1.25	"	1.50
Mixed Colored Shavings	2.50	"	2.75
New Manila Envelope Cuts, one cut	5.00	"	5.50
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	3.50	"	3.75
Mixed Kraft Env. & Bag Cuttings	3.75	"	4.00
Kraft Envelope Cuttings	3.75	"	4.00
No. 1 Heavy Books & Magazines	2.50	"	2.60
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	4.25	"	4.50
Groundwood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	3.50	"	—
No. 1 Mixed Paper	—	"	.95
Overissue News	1.50	"	1.75
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	—	"	1.40
Jute Corrugated Cuttings	1.07½	"	—
Paper Strings	2.25	"	2.50

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	5.00	@	—
Domestic	5.00	"	5.12½
Sisal Rope No. 1	6.00	"	—
Sisal Rope No. 2	5.50	"	—
Mixed Rope	5.25	"	—
Mixed Strings	2.00	"	2.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	6.25	"	—
Soft Jute Rope	5.00	"	5.25
Jute Carpet Threads	6.00	"	—
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	4.75	"	5.00
Domestic	5.00	"	5.25
South America	5.25	"	—
Wool Tares—			
Foreign	4.50	"	—
Domestic	4.50	"	—
Aust. Wool Pouches	5.00	"	5.25
New Zealand Wool Pouches	5.25	"	5.50
New Burlap Cuttings	6.00	"	6.50
Heavy Baling Bagging	5.25	"	5.75
Paper Mill Bagging	3.50	"	3.75
No. 1 Roofing Bagging	1.75	"	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.06	@	.06½
Fancy Percales	.04½	"	.05
New White No. 1	.06¾	"	.07
New Light Flannelettes	.09½	"	.10
Canton Flannels, Bleached	.11	"	.12
Underwear Cutters, Bleached	.12	"	.13
Underwear Cutters, Unbleached	.11	"	.12
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03¼
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.11½	"	.12
Blue Cheviots	.05½	"	.06½
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.06	"	.07
O. D. Khaki	.06	"	.06¼
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06¼
B. V. D. Cuttings	.12½	"	.13

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	2.00	"	—
No. 2	1.90	"	2.00
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A.	1.35	"	—
Quality B.	1.20	"	—
Quality C.	.95	"	—
Old Manila Rope	6.00	"	—

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	$110.00	@	$120.00
No. 1 Hard White Shavings, unruled.	105.00	"	115.00
No. 1 Soft White Shavings	80.00	"	95.00
No. 1 White Ledger.	55.00	"	65.00
No. 1 Heavy Books & Magazines	40.00	"	43.00
White Blank News	43.00	"	49.00
Mixed Kraft Env. & Bag Cuttings	75.00	"	85.00
No. 1 Assorted Old Kraft	45.00	"	55.00
Overissue News	38.00	"	42.00
No. 1 News	30.00	"	—
No. 1 Mixed Paper	19.00	"	20.00
Old Corrugated	33.00	"	—
Mill Wrappers	25.00	"	29.00

MARKETS

BLANC FIXE — Raw materials shortage hinders active markets. Pulp is currently quoted at $55 per ton, in barrels, car lots, at works; the powder is currently quoted at $67.50 per ton car lots, f.o.b. works.

BLEACHING POWDER — Supplies adequate to meet current demands although there is some delay in current shipments. Quotations are unchanged. Prices on bleaching powder range from $2.65 to $3.35 per 100 pounds, in drums, car lots, at works.

CASEIN—Current prices on processed acid precipitated casein are reported around 42 to 48 cents per pound for both domestic and Argentine grades; f.o.b. shipping point, with quantity not specified at the present time. Supplies are expected to increase in the next few months.

CAUSTIC SODA—Demand very strong with supplies tightest ever. Shipments are behind schedule. Cutback production further reduces stocks. Solid caustic soda is reported at $2.50 per 100 pounds; flaked and ground offered at $2.90 to $3 per 100 pounds.

CHINA CLAY—Supply tight as demand continues heavy. Domestic filler clay is currently $8.50 to $9 per ton, car lots. Coating clay is $12 car lot and $16 less car lot. Imported clay is $20 to $22 per ton, car lot, export warehouse; and $45 less car lot for powdered.

CHLORINE—Market tight as demand continues to exceed output, stocks low. Lack of tank cars continues to hamper deliveries. Quotations unchanged. Chlorine is currently quoted at $2 to $2.25 per 100 pounds.

ROSIN—Gum rosin in drums, per 100 pounds net, in yard New York, car lots, B, D, $10.80; E, F, G, H, I, K, M, $11.80; WG, $12.05; WW, $12.05; Wood Rosin, per 100 pounds l.c.l., f.o.b. N. Y., B, $4.65; FF, $7.95; G, H, I, $8.75; WW, $8.95.

SALT CAKE—Demand continues to increase with supplies showing little improvement. Prices remain unchanged. Domestic salt cake is quoted at $22 to $24 per ton in bulk. Chrome salt cake is quoted at $16 per ton.

SODA ASH — Demand active as supplies continue short, previous orders filled. Contract orders prevail at the same high levels. Current prices, car lots, per 100 pounds, are as follows: in bulk, $1.05; in paper bags, $1.20; and in barrels, $1.60.

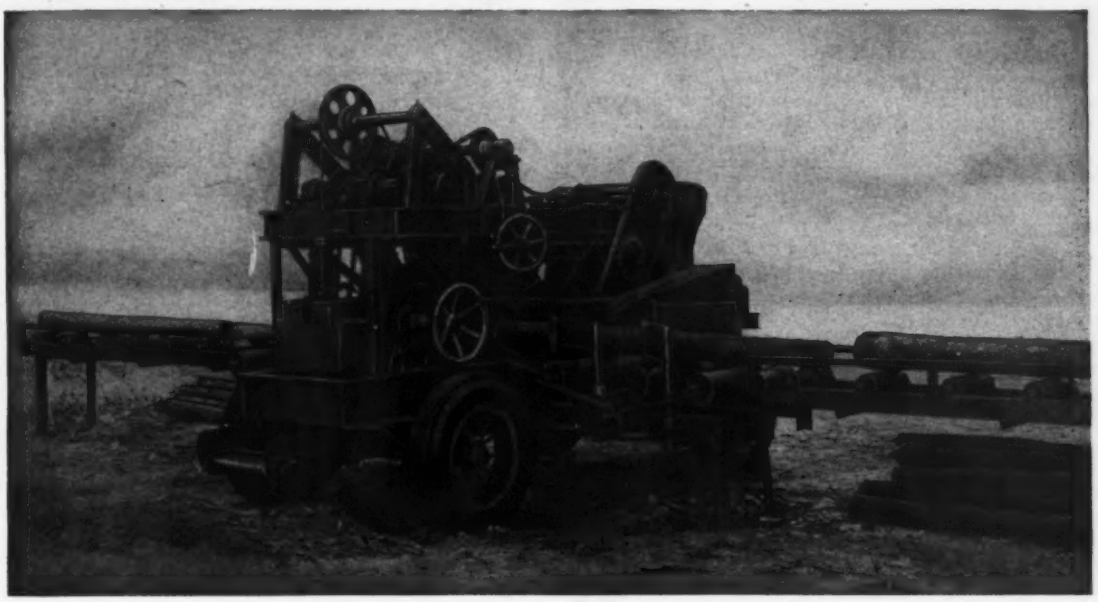
STARCH — Supplies are showing steady improvement. Previous orders filled. Starch prices remain unchanged. The pearl grade is quoted at $3.62 per 100 pounds; powdered starch at $3.73 per 100 pounds.

SULPHATE OF ALUMINA—Demand active, supply fair. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.20 per 100 pounds, in bags, car lots, f.o.b. works. The iron free is quoted at $1.75 to $2 per 100 pounds, in bags, at works.

SULPHUR — Strong seasonal demand is reported with stocks plentiful to meet all requirements. Annual contracts are quoted at $16 per long ton, f.o.b. mines; the price f.o.b. at Gulf Ports is $17.50 per long ton.

TALC—Domestic and French grades are moving in fair volume with prices steady. Domestic grades are currently quoted at from $16 to $30 per ton at mines; Canadian at $35 to $45 per ton. All prices in car lots.

Nekoosa Portable Wood Peeler



SAVES

Freight Costs
Labor
Wood

Write for Information

●

Nekoosa Foundry & Machine Works Inc.

Nekoosa, Wis. **U. S. A.**

IN PART

The United States has risen through the primary subsistence stage of an agricultural economy. It has, in all likelihood, essentially surmounted a secondary technological stage where the best brains of the country were devoted, not to production itself, but to the *machinery* of production. It now is emerging into a vital third era when the real problem is to produce the fruits of the machine so cheaply and efficiently that they move almost automatically into the hands of the ultimate beneficiary, the consuming citizen of the United States.—*Donald Armstrong, American Standards Association.*

It should be the national policy to conserve the human values inherent in abundant forests. Aside from the essential service of forests to recreation, a sustained yield of wood is the basis in many parts of the United States of stable communities and payrolls, maximum employment and satisfactory working conditions for labor. These goals are vital parts of a national program and their attainment will add wealth and prosperity to the country.—*From the Program of the American Forestry Association.*

Only 20 percent of the accidents appear to have occurred in the half (or more) of the work done mechanically. Out of 5,353 logging accidents reported last year, 2,096, or almost 40 percent, happened to fallers and buckers. Does it not seem clear that concentration on this particular angle of our accident problem must bring direct financial benefit in substantial amount? —*W. Black, from an address before the Truck Loggers Association of British Columbia.*

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1947		Corresponding Weeks—1946	
January 4	96.3	January 5	89.1
January 11	102.6	January 12	95.3
January 18	103.8	January 19	94.4
January 25	103.7	January 26	94.5
February 1	104.0	February 2	101.5
February 8	*106.2*	February 9	99.7

COMPARATIVE MONTHLY SUMMARIES

1946		April	102.7	August	104.7	Dec.	97.0
Jan.	94.7	May	100.7	Sept.	101.3	Year Avg.	101.1
Feb.	98.4	June	104.6	Oct.	106.4	1947	
March	104.4	July	94.0	Nov.	105.5	Jan.	*102.1*

COMPARATIVE YEARLY SUMMARIES

	1940	1941	1942	1943	1944	1945	1946	1947
Year to Date	88.7	86.5	104.1	87.4	88.7	86.4	95.4	*103.7*
Year Average	85.6	97.4	90.4	87.8	88.1	89.7	101.1	

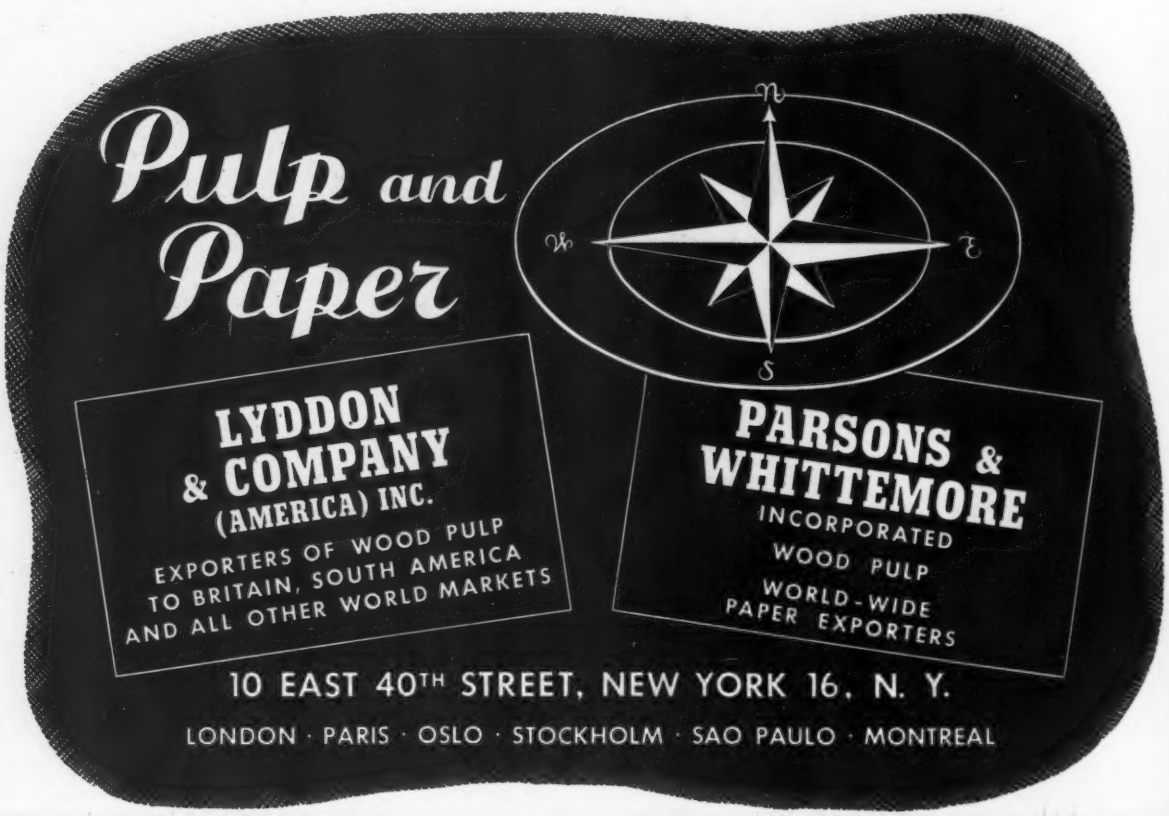
PAPERBOARD OPERATING RATIOS†

Current Weeks—1947		Corresponding Weeks—1946	
January 4	85	January 5	75
January 11	102	January 12	94
January 18	103	January 19	93
January 25	101	January 26	94
February 1	102	February 2	95
February 8	*104*	February 9	97

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1946	90	97	100	99	94	97	89	99	96	100	99	92	96
1947	99												

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.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EDITORIAL

Small Business

Swinging a mean set of phrases Senator Wherry of Nebraska, chairman of the new Senate Special Committee to Study Problems of Small Business has come out in good solid fashion with all of the old familiar words. Pledging himself to make a broad investigation of the news and publishing business, beginning, according to newspaper dispatches, with the newsprint situation, the Senator is going right to the heart of the whole problem, as he finds it easiest to make the headlines in his description of the problem.

"If there is any monopoly in this business we are going to find out about it." according to the doughty chairman. "We are going into all angles with public hearings just as soon as possible."

Sometimes it seems that an accurate measure of the public standing of an industry or a corporation can be gauged by the reverse process of observing the ease with which it lends itself to the purpose of those who want to get quoted in the news. The pulp and paper industry at least will have that much forlorn comfort as it makes ready to tell its story all over again to the Senator and his committee. But aren't we getting far afield from the purpose of the committee?

It appears, from a reading of the first report of its retiring chairman to the committee that small newspapers have lots of trouble. They complained bitterly about the scarcity and unusually high cost of machinery; and they found certain practices of news feature services to have an extremely restrictive effect. They even found it difficult to sell advertising enough to make a profit, according to some letters that were filed with the report. The troubles of small business, it appears, are even broader than the Senator realizes, if he really wants to go into that. Or does he just want to pick a subject which he feels certain, will guarantee him headlines?

No Cause for Hysteria

Two sources, closely akin but in widely scattered cities over the weekend came to the front with reasoned views and testimony on the newsprint situation that were refreshing because of their well-balanced attitudes. Elsewhere in these pages the American Newspaper Publishers Association inserts into the record of its experience that no newspaper in its membership has been in danger of closing down for lack of paper, that where possibility of such danger has arisen newsprint mills have made paper available to dealers who handled the imperiled accounts, and that records of extremely high prices for spot delivery usually are accompanied by a competition in bidding among small buyers that can only accrue to the benefit of some middle man.

To this testimony should be added the views of Irwin Maier, vice-president and publisher of the Milwaukee Journal, speaking last week to members of the Inland Daily Press Association meeting in the Congress Hotel, Chicago. He stamped as "unfair" remarks by newspaper columnists that certain metropolitan newspapers were going into the newsprint business. "If those papers had not, some years ago, set up their own mills in Canada." Maier said, "they would have been a drain on the newsprint of other papers." He called attention to the fact that metropolitan papers had received cuts as high as 25% in their allotments of newsprint under wartime rationing, tonnage which has been restored without causing the smaller papers to suffer a newsprint shortage. Mr. Maier commended certain newspapers, including the New York Daily News and the Chicago Tribune for "contributing materially to the newsprint supply" in his report to the newsprint committee of the Association. The committee, in turn, reported that fear of suspension through lack of newsprint by smaller newspapers was "not justified in most cases."

Kraft Demand

To Stuart Edgerton of the United States Rubber Company goes the week's award for picturesque phrasing. He would not be surprised, it appears from his comment in the Bulletin of the National Association of Purchasing Agents, to find people starting to use kraft paper jewelry as a means of displaying their wealth. Two factors in the kraft supply field suggest this fanciful thought to him. The commodity has almost disappeared from the shelves of the dealers, and he gets the distinct impression that some of his suppliers seem to think that this is the time to reap a golden harvest. Cause for this condition he finds in the high pressure of demand.

Some consumers, he asserts, evidently feel that they are definitely in a prewar market, because the demands for prewar quantities and prewar standards of quality of kraft paper and kraft paper products are one of the highlights of the paper market today. While there is a very definite shortage of pulp, particularly high-grade pulp, would the mills be able to produce any more square footage of paper than they are at present? Lightweight kraft papers are difficult to obtain because the kraft manufacturers are interested in gaining the greatest amount of return per ton of paper manufactured. Buyers should resist any sales effort to increase kraft paper prices which is not absolutely justified.

W. L. Cook

EDITOR

Eliminate shutdowns due to SLIME
Use Du Pont
"LIGNASAN-X"
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"Lignasan-X"* prevents the build-up of slime—keeps the system clean, all the way to the dry cans. It is ideal for use in preparing stock solutions—gives "over-the-week-end" protection and allows fast Monday morning starts.
You'll find that this slime-control agent not only minimizes shutdowns for washing the system, but acts also as an aid to prevent such production bottlenecks as sheets sticking to the press rolls, and smears, holes and breaks in the sheet caused by slime. Ask your Du Pont representative about "Lignasan-X," or write for additional information.
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SECTION OF THE

TECHNICAL ASSOCIATION
OF THE PULP AND PAPER INDUSTRY

122 E. 42nd ST., NEW YORK 17, N. Y. *Edited By* R. G. MACDONALD, *Secretary*

Summary of TAPPI Convention Papers

From the Program of Convention Week at Hotel Commodore, New York, February 24

10:00 A.M. GENERAL SESSION (Grand Ball Room)
G. W. E. Nicholson, President TAPPI, Chairman

1. SECRETARY'S REPORT—R. G. Macdonald

2. PRESIDENT'S ADDRESS—G. W. E. Nicholson

3. TELLERS REPORT

4. JOINT TEXTBOOK COMMITTEE REPORT

5. TECHNICAL MERCHANDISING OF PAPER—John W. Crosson

Paper has successfully invaded other fields of application during the war, and should now strive to hold and extend these gains by taking advantage of new processes and methods presently available. The suggested approach to this is through the development of a product and sales point-of-view by the mill chemist and engineer.

The history of paper sales in this country has been one of concentration upon standard grades manufactured from a limited number of raw materials. Now, new basic materials are available with which to work and await only the propor exploitation.

The Mead Corporation has inaugurated a program of investigation of new products, processes, and materials. This has required contacting suppliers of raw materials to the paper industry *first*, rather than waiting for them to make the initial contact with new products which they believe the industry can use. A New Products Division has been set up to market the new grades of paper resulting from these contacts, and mill management and sales have become more research-minded. The case history of an old New England paper company is a perfect example of what can be accomplished by the technical approach to the sale of paper.

6. SCANDINAVIAN RESEARCH ORGANIZATIONS—Edwin C. Jahn

The greatest natural resource of the so-called "Nordiska Länder," or northern countries, is timber. The pulp and paper industry of this region is the area's greatest industry in terms of capital investment, value of products, and export business. Another resource which holds Scandinavian industry at its high level is technical skill, both of the workers (for precision work and individual responsibility) and of the engineers and research men.

These three facts together make a survey of Scandinavian research organizations of particular interest to the technical men of the American pulp and paper industry. In each of the three important pulp and paper producing Scandinavian countries, i.e., Sweden, Finland, and Norway, there is close coordination between the different types of research institutions such as universities and technical colleges, government institutions, and industrial laboratories. These research efforts are interwoven in a national pattern for the common good in a number of different ways, such as through scientific academies aided by the government and through research development associations organized by industry.

Research in pulp and paper in all three countries is promoted by the industry as a whole as well as by individual companies and by the universities and government laboratories. In each country the industry maintains a central research laboratory. Furthermore, a number of individual companies have recently built large well-equipped private research laboratories. This is a recent development and other companies are making similar plans.

In Sweden the pulp and paper, wallboard, and plywood industries and the government have cooperated in organizing and building in Stockholm a fine modern forest products laboratory. The buildings for this institute cost well over 1 million dollars and house excellent fundamental research laboratories for cellulose, paper and wood and also complete pilot plants for pulp, paper, and wallboard, including a paper machine.

2:00 P.M. FIBROUS AGRICULTURAL RESIDUES SESSION (Room B-C)

S. I. Aronovsky, Chairman

1. THE PULPING OF STRAW WITH DIGESTION LIQUORS CONTAINING SODIUM SULPHITE—George S. Hannaway

Consideration is given to standard practices of cooking straw insofar as chemical makeup, steam pressure, cooking time, and amount of straw charged per rotary are concerned. The need for consideration of temperature, rather than pressure, inside digesters is emphasized since temperature, rather than pressure, is critical in determining rate of delignification. An average strawboard is tentatively defined as having the following characteristics:

Sheet weight	30 to 32 lb. per 1000 sq. ft.
Caliper	9 to 11 points
Rihele (conventional type test)	20
Bursting strength	36 to 39

A new cooking process may represent an improvement: (1) by producing a superior product, (2) by reducing plant operating problems, (3) by reducing stream pollution problems, and (4) by increasing production with existing facilities.

The data presented, based on experiences of two mills, in-

dicate that when straw is cooked with mixtures of sodium sulphite, lime, and soda ash or caustic soda, the Riehle test may be expected to increase 10 to 20% while at the same time sheet weight is slightly reduced. Bursting strength is relatively unaffected. Experience indicates that the following advantages may be expected from the use of sodium sulphite: (1) reduction of lime use, (2) improvement in properties of strawboard, (3) reduction of washing time of pulp, (4) reduced liming of paper machines, (5) reduction of fines in pulp which tends to give white waste water a lower biological oxygen demand, (6) production of lighter weight sheet, and (7) improvement in yield.

Suggestions for future work include adaption of the semi-chemical process to straw pulping and use of higher temperatures to accomplish more rapid delignification and total elimination of lime.

2. EVALUATION OF NINE-POINT STRAW FOR CORRUGATING—Norval F. Wilson

A representative group of mills producing 9-point straw paper have cooperated in submitting samples which were tested independently in the laboratories of Alton Box Board Company, Container Corporation of America, Institute of Paper Chemistry, and the Northern Regional Research Laboratory.

The test results were in close agrement and a tabulation revealed some interesting relationships in physical properties. The product in each case was found to have certain desirable qualities necessary in the making of an acceptable grade of corrugated board. The Riehle compression test is clearly shown to be one of the most reliable indications of straw quality. Stiffness and tensile tests provide excellent confirmation. The amount of fiber other than straw in the furnish is reflected in the weight variations, which, in conjunction with caliper, shows that calendering has not produced as much difference in density as might be expected.

An evaluation of the samples has been made whereby they range in a series according to increasing strength characteristics. Code numbers cover the identity of each mill involved in this evaluation. Charts have been prepared to show the trend of the test values, and these should provide a basis for study of the most promising methods for improving the qualties desirable in 9-point straw used in corrugating.

3. TREATMENT OF COMBINED STRAW—C. J. Willard, R. D. Lewis

In observations and experiments since 1938, permitting wheat straw to remain on the field as the combine left it has reduced the stand of legumes and the yield of legume hay the next season, the reduction being more or less proportional to the amount of straw present above 1 ton per acre.

This loss was caused in part by mechanical shading out, but more to the death, during the fall and winter, of plants that had made a good growth through the straw. This was apparently caused by diseases similar to "damping off," but no plant pathological studies have been made.

In all comparisons of methods handling combined straw, the best stands of clover and alfalfa have been obtained by cutting the stubble immediately after combining and removing all material at once. With this method as 100%, the yield of clean hay after leaving the straw untouched has averaged just 50% for the two recent years of the test. Cutting and taking all material off a month after combining yielded 95%. Cutting at once after combining and letting the material remain averaged 86% and removing the combined straw at once, with or without clipping in late August, 90 to 95%.

The recommendations below are based on these tests and many earlier observations:

1. For dairy and other livestock farms—Cut combined stubble at normal hay height as soon as combining is completed; remove all straw and stubble for bedding. If less bedding is required than this will make, either remove the loose combined straw and clip later, or cut all just after harvest, and leave on the ground what is not wanted.

2. For grain farms—Remove the loose combined straw only, or cut the stubble just after harvest and remove everything, or cut the stubble just after harvest and leave everything on the ground. If the potash and phosphate which are removed are returned, there can be no objection to selling straw which, if left untouched after combining, seriously endangers the most important soil-building crops. The organic matter left in the soil after these methods of treatment will be essentially proportional to the hay yields.

4. AGRICULTURAL RESIDUE PULPS COMPARISON WITH TYPICAL WOOD PULPS—S. I. Aronovsky, Alan Rhodes, and E. C. Lathrop

Papermaking fibers from agricultural residues are more easily hydrated than wood fibers and generally are shorter and of much narrower fiber diameter. Their logical use in the manufacture of paper should depend on capitalization of these and other special characteristics. Successful commercial ventures based on this principle are: insulation board from sugarcane bagasse, book and Bible paper from esparto, cigarette paper from seed flax straw, and corrugating paper from cereal straws.

This paper deals with an evaluation of certain agricultural residue pulps in terms of well-known types of commercial wood pulps. The wood pulps included hardwood and softwood sulphates, softwood neutral sulphite and kraft, and hardwood soda, while the agricultural residue pulps were secured by the soda process from wheat and rice straws, sugarcane bagasse, flax shives, and hemp hurds. The beating and strength characteristics of these pulps were compared using the same methods and equipment, the latter consisting of standard laboratory beaters with sharp and dulled tackle, a Morden laboratory beater, and a fiber fractionator. The handsheets and tests were made in accordance with the TAPPI Standards.

The results show that the agricultural residue pulps compared favorably with the wood pulps in all of the strength characteristics except tear resistance. Except for the tear value, wheat straw soda pulp had better strength properties and required much less beating than the softwood sulphite pulps. It was superior to hardwood soda pulp in all of the strength properties measured.

The data on beating and on fiber fractionation indicate that the pulp fibers were cut to a greater degree by the Morden than by the standard laboratory beater. The Morden apparatus produced lower maximum strength values.

The results described in this report show definitely that the standard pulp testing equipment and methods are suitable for evaluating agricultural residue pulps.

5. PULPING WITH SODIUM SULPHITE TO PRODUCE STRAWBOARD—S. I. Aronovsky, A. J. Ernst, H. M. Sutcliffe

A series of experimental laboratory cooks were made on sound, combine wheat straw using lime and caustic soda, sodium sulphite, and various combinations of lime and sodium sulphite as the pulping agents. The resultant pulps were evaluated for their strength properties and papermaking characteristics by a standardized procedure reported previously.

The pulps prepared with 2% sodium sulphite had higher freeness and tear resistance, but lower bursting and tensile strength and density than the lime-caustic pulp. Larger amounts of sodium sulphite resulted in decreased yields of pulp with somewhat improved strength properties. The use of lime and sodium sulphite together gave practically the same yields of pulp as obtained with sodium sulphite alone, but with better strength characteristics. It was found that the pulp had improved strength properties if the pH of the spent liquor, at the end of the digestion period, had a value of 6.0 or above. The pulp with the best strength properties and operating characteristics in this series of experiments, was produced by cooking with 2% lime and 2% sodium sulphite, based on straw. Increased freeness of the pulp and lower density of the resultant paper are the outstanding characteristics developed by the use of sodium sulphite for pulping straw.

2:00 P.M. WATER SESSION (East Ball Room)
L. B. Miller, Chairman

1. PAPER—Daniel J. Saunders

2. THE INTERSTATE COMMISSION ON THE DELAWARE RIVER BASIN—James H. Allen

The work of the Interstate Commission on the Delaware River Basin (Incodel) consists of improving the Delaware

Valley and the Delaware River proper in the broadest sense of the term. The efforts of the commission are directed towards the reduction of pollution of this river and its tributaries, utilizing the water equitably among the several interested states as needs arise, conserving the soil and forests of the valley, educating the public to the best and most advantageous usages of the valley and its waters, and carrying on such researches, investigations, and planning as are required by the above activities.

The commission and its activities are unique in that it represents a cooperative enterprise sponsored by the states of Delaware, New York, New Jersey, and Pennsylvania in which comparatively little authority has been delegated to the commission but the extensive results obtained have been due to the use of persuasion, a sound and constructive program, and a will to cooperate on the part of the several states involved. Great strides have been made in reducing the pollution of the stream by industries and municipalities and in the conservation of soil and forests. Details of accomplishments, particularly on the Delaware River proper and its main tributary, the Schuylkill, are presented in the body of the paper.

Incodel represents an enterprise which might profitably be followed on many major streams of the United States.

3. MODERN METHODS OF FEEDWATER CONDITIONING FOR HIGH PRESSURE BOILER PLANTS—Frank N. Kemmer

The various methods of conditioning feed water to obtain four basic advantages for the protection of steam generating and steam using equipment, namely, zero hardness, low total solids, low silica concentration, and low and controllable alkalinity, are given. Zero hardness is desirable to eliminate any possibility of sludge formation in the boiler. By keeping the total solids content of the treated water low, a purity approaching that of distilled water is possible and in any case advantageous. The presence of silica in any unreasonable amount tends toward the formation of a tough boiler scale and also carries over with the steam into steam using equipment. Low alkalinity is necessary to prevent excessive boiler blowdown.

Precipitation type softeners of the single stage and two stage design, ion exchange equipment of the standard zeolite type, and the newer demineralizer are discussed.

4. MODERN WATER CHLORINATION—L. L. Hedgepeth

Water chlorination has grown from a relatively crude process into the efficient methods used today for many purposes other than disinfection. It can consistently produce safe, pleasing water.

The last decade was characterized by process refinements and distinguished fundamental studies. These have broadened chlorination chemistry and water applications. Faber, Griffin, Chamberlain, and Calvert have made major contributions to reaction knowledge, while measurements have been improved by Hallinan, Gilcreas, and Laux.

Water chlorination has been greatly improved both in dependability and effect by this added knowledge. It is the best purification practice today to produce the type and quantity of residual predetermined as desirable.

Precise terminology is needed for this more specific practice. Those terms proposed by an official committee are given. The author's opinions are supported by a detailed discussion of the chemistry of chlorine in water. This includes the fundamental reactions in the presence and absence of ammonia.

Previously held theories of how chlorine kills bacteria have been supplanted by the new enzymatic explanation of Green and Stumpf. The several factors controlling the chemical action of chlorine also control its bactericidal velocity.

Much remains to be learned. Needs include more study on viruses, on the ultimate fate of large doses in grossly polluted water, and on the enzymatic bactericidal explanation.

5. PROGRESS OF POLLUTION ABATEMENT IN THE TENNESSEE VALLEY—W. G. Stromquist

The major part of stream pollution in the Tennessee River system originates with municipalities and industries in Virginia, North Carolina, and Tennessee. In 1945, the General Assembly of Tenneseee passed a pollution control law and established a Stream Pollution Control Board. In 1946, Virginia passed a pollution law and established a Water Control Board. North Carolina established a Stream Sanitation Committee to make a survey so that legislation may be based upon actual data.

The Pollution Control Board of Tennessee has adopted general regulations regarding new construction, maintenance and operation, records and reports of operation and routine submission of samples.

The policy of the board is one of cooperation with municipalities and industries.

The TVA has cooperated with the Tennessee Stream Pollution Board in field surveys. In the summer of 1946, an extensive survey was made of the South Fork of the Holston River, utilizing a schedule based on time of water travel so as to sample the same prism of water at successive downstream points.

A technical committee was appointed by the Tennessee Board, which developed general criteria for the definition of pollution in the waters of Tennessee.

An unusual problem which illustrates cooperation between state agencies, TVA, and industry developed at Harriman, Tennessee, in connection with wastes discharged from the Mead Corporation plant. Because of releases of cold water from Norris Dam, an upstream flow was encountered on the bottom of the Emory River, which carried pollution from the mill and from the city sewer to the municipal water intake.

Progress is being made in the correction of undesirable conditions. Several municipalities have engaged consulting engineers; and several plants, notably the Champion Paper and Fibre Company at Canton, North Carolina, and the Tennessee Copper Company, are contemplating changes in equipment which will result in the reduction of pollution.

A spirit of cooperation and mutual understanding has been developed between industry and regulatory agencies, which leads toward an optimistic view of an early attainment of clean rivers.

6. RECENT DEVELOPMENTS IN THE DETERMINATION OF BIOCHEMICAL OXYGEN DEMAND—Louise E. McGrath

The waste water from paper mills carries organic matter such as fiber, resins, starches, etc., which is capable of decomposition by the bacteria and protozoa contained in the stream into which the waste is discharged. The organisms depend upon the oxygen dissolved in the natural water for their life processes and if the waste from the mill in the course of its decomposition uses up the oxygen, detrimental effects on the stream are noticeable.

Since the use of the oxygen by the organic matter follows a biochemical law, inversely the quantity of oxygen should give an indication of the amount of matter present which is capable of being decomposed. The amount of oxygen measured indicates Biochemical Oxygen Demand.

The literature contains very definite instructions for the mechanical technique of the test which are only briefly mentioned in this paper. In using the method on paper mill waste water certain modifications must be employed and it is in the selection of the proper one that difficulties may arise.

The waste water must be diluted in order to insure the oxidation of the contained matter and the selection of the right dilution water is of prime importance. Dilution waters have been used which include distilled water, tap water, water from the stream into which the waste discharges, and water fortified with sodium bicarbonate. At the present time a dilution water containing portions of five chemicals is accepted as standard.

Although paper mill wastes contain bacteria in varying amounts, in order to provide for more uniform results it is now recommended that the diluted sample be seeded with normal unfiltered domestic sewage.

Toxic substances which interfere with the normal growth of bacteria and protozoa are frequently present in paper mill waste waters. Chlorine, chloramine, or chlorinated compounds must be removed as well as any excess alkalinity or acidity. Phenates or mercury compounds cannot readily be removed but it is probable that they are not effective in the diluted samples.

The Rideal-Stewart modification has been used in the determination of the dissolved oxygen but recently sodium azide has been found satisfactory and simple to use.

Biochemical Oxygen Demand results may be expressed as parts per million, as population equivalent, or as pounds of oxygen per ton of product and are useful in indicating how a paper mill waste will behave after it is discharged into a stream.

2:00 P.M. Engineering Session (West Ball Room)
J. W. Hemphill and J. E. A. Warner, Chairmen

1. DRIVE FOR THE CARTHAGE CHIPPER—J. Edgar Rhoads

The Carthage chipper has a 5-ton solid, cast grey iron alloy disk with a 4-ton pulley. This is driven at 360 r.p.m. by a slip-ring 200 hp. motor with special leather belting to give a capacity of about 60 cords per hour.

2. DANDY ROLL DRIVE FOR FINE PAPER MANUFACTURING—Henry D. Johnston

The Strathmore Paper Company has been operating Spencer dandy roll drives on its fourdrinier machines for more than eight years. The initial installation was made when, in an effort to assist in the solution of difficult watermarking problems, Mr. John Spencer, asked the company to allow him to experiment with the application of a positive power drive to the dandy roll.

The first experiments involved the use of the best available V-belt drives. It soon developed, however, that it isn't possible to obtain the necessary degree of precision with V-belt drives, nor can dependable results be obtained with these drives under the variable operating conditions existing at the wet end of a paper machine.

Mr. Spencer, therefore, turned his attention to the development of a drive which would give a positive, but accurately adjustable ratio between the speed of the paper machine and the peripheral speed of the dandy roll. He first secured this positive feature by means of conventional mechanical connections involving the use of shafts, chains, and sprockets, and soon demonstrated what could be accomplished with power driven dandy rolls. The next step came when, with the assistance of the General Electric Company, an electrical system replaced the mechanical connection with a consequent elimination of the maintenance problems inherent in the mechanical drive.

The electric drive gives the machine tender a sensitive and thoroughly dependable means of controlling his dandy speed. It responds instantaneously to changes in paper machine speeds and may be accurately adjusted to give the dandy roll any desired percentage of "lead" over the wire speed.

The results obtained on the paper machine through the use of the Spencer drive exceeded expectations by a wide margin. Mr. Spencer had been working specifically towards improvement in watermarking and it was realized that the financial return from improvement in appearance alone would be difficult to evaluate. It was soon apparent, however, that paper machine speeds could be increased materially and still retain the improved appearance of the sheet. This, of course, represented a very definite financial return and made it possible to absorb the cost of installation in a relatively short period.

In general, the gains in paper machine speeds which Strathmore can definitely credit to the Spencer dandy roll drive will average close to 20%. It can readily be seen that this substantial gain in production represents a corresponding substantial decrease in manufacturing cost.

3. SPOT CONVERSION FOR ADJUSTABLE SPEED—W. R. Hough, J. L. Van Nort

Adjustable speed contributes to economical paper and paperboard production by making it possible to operate at the optimum speed for a given weight. It is also of value when it is necessary to regulate machine speed to avoid operating difficulties caused by nonuniform stock.

As operating speeds on processing equipment are pushed to higher levels to increase production and reduce costs, there is an increasing emphasis being placed on the smoothness and uniformity of acceleration and deceleration.

A small conversion unit installed at the machine to be operated—spot conversion—requires less maintenance than a single large generating unit upon which the operation of the entire mill depends.

The basic principle employed in the spot conversion drive is variable voltage direct current. The basis elements of this system are: (1) a unit to convert alternating to direct current, (2) a source of excitation which can be controlled for obtaining a variable d.c. voltage, (3) a d.c. motor receiving power from the conversion unit, and (4) suitable control for starting, stopping, and controlling the speed of the motor.

Application of variable voltage drives is not confined to sectional paper machine drives and supercalenders. Other applications include winders and rewinders; variable output pumps; mixers; laminating, corrugating, and coating machines; washers and filters; log conveyors; pulp grinders; and machine tools.

4. SPOT CONVERSION DRIVES IN PAPER MILLS—Richard Nelson

This paper discusses the relative advantages and disadvantages of using as the source of direct current for adjustable speed drives in pulp and paper mills, the "common M-G system" versus the "spot conversion" or self-contained, packaged unit.

From his experience with variable speed drives for pulp and paper mill equipment acquired over a number of years, the author sets up four considerations as paramount in arriving at the right choice of system for any given installation: (1) cost of installation, (2) flexibility of reuse, (3) cost of maintenance, and (4) operating performance.

Citing specific instances in the pulp and paper field where one system or the other was chosen—and the reasons why—the author fortifies his conclusions with detailed cost figures.

Attention is also given to recent electronic developments, with examples of where electronic variable speed drive characteristics have proved especially useful in the paper field.

5. HEAT BALANCE AND THE PAPER MACHINE DRIVE—R. R. Baker

There are two important costs which must be taken into consideration in the operation of the paper machine: First—the power costs for driving the machine, and second—the steam costs for drying the paper produced on the machine. Economic operation of the machine requires that both of these costs be held to a minimum. In the modern mill high pressure and temperature steam generation has made it possible to generate a large part of the plant power requirements as a byproduct of the process steam requirements by the use of bleeder type turbine units. In any paper mill, where it is necessary to operate on condensing units in order to maintain a balance between the plant load and the process steam demand, it is a fallacy to assume that inefficiency in power generation can be justified even though the process steam requirement of the particular operation will produce more power than required in its operation.

Essentially the power requirements vary directly as the operating speed of the paper machine, whereas the drying steam requirements, remain constant within reasonable limits. It is evident therefore if a balance is maintained between the power and process steam requirements of the paper machine at high speed, an excess of power will be generated from the same quantity of process steam at the low speed provided high conversion efficiency is maintained over the operating speed range. With the proper plant layout this excess power generated under these conditions will serve to relieve the condensing units in the main plant power house.

There are three general types of drive applied to the modern paper machines including sectional electric, single motor mechanical, and turbine mechanical. The operating efficiency of each type is discussed with reference to the overall heat balance of the plant.

6. A STUDY OF CERTAIN FACTORS AFFECTING THE FILTRATION OF SMOKE BY FIBROUS MATERIALS—J. J. Perot

In order to provide fundamental information necessary for the improvement of fibrous filters in military and industrial masks, a study was made of the mechanism of aerosol filtration and of the choice and processing of fibrous materials for use as air filters.

The filtration was found to be due primarily to mechanical effects. No type of fiber tested showed any unusual affinity for the test aerosol, and examination of the fibers under the electron microscope suggested that the particles collected on a fiber were uniformly distributed over its surface.

The most important factor governing the choice of a fiber for aerosol filtration appeared to be fiber diameter. Filtering efficiency was found to increase with decrease in fiber diameter.

A study of fiber processing revealed that, at constant sheet weight, filtering efficiency was dependent upon sheet density. Moreover, this relationship appeared to be independent of the type of processing used to vary fiber density. For maximum filtering efficiency an optimum sheet density, as well as an optimum sheet weight, was found to exist for each type of fiber.

The addition of small amounts of certain fillers, such as asbestos and Celite, was found to increase filtering efficiency.

2:00 P.M. FUNDAMENTAL RESEARCH (Room A)
Harry F. Lewis, Chairman

1. THE DECOMPOSITION OF METHYLATED SPRUCEWOOD—F. E. Brauns, Jack J. Yirak (By title)

The possible ways in which lignin can be combined to other wood components in lignified materials are discussed.

Methylated sprucewood, when decomposed with methanol in the presence of a small amount of hydrogen chloride, gives a methanol lignin with 30.6 methoxyl content. When the methylated wood is decomposed with phenol and hydrochloric acid, a partially methylated phenol lignin containing 3 phenol groups and 16.4% methoxyl is obtained. Methylated sprucewood is not changed by 5% sodium hydroxide at 175 to 180°.

Tuesday, February 25, 1947

9:00 A.M. OPTICAL PROPERTIES AND INTER-COLOR SOCIETY COUNCIL SESSION (Grand Ball Room)
A. H. Croup, Chairman

1. THE PAPER MAN'S INTEREST IN COLOR—A. H. Croup

2. COLORIMETRIC STANDARDIZATION IN INDUSTRY—Ralph M. Evans

3. COLOR ORDER SYSTEMS FROM MATERIAL STANDARDS IN LIKE-MEDIA TO SYSTEMS THAT REPRESENT INCREASING DEFINITIONS OF A USEFUL COLOR SPACE—Carl E. Foss

4. RELATION OF GLOSS TO COLOR — Richard S. Hunter

Gloss is a variable which must be considered in addition to color when one is studying the factors of appearance. Traditionally, color is associated with diffuse or pigment reflection, while gloss is associated with specular or surface reflection. Specularly reflected light is generally nonselective (gray). It may be said to cause a gray component to be added to the colored (pigment) component of reflection in amounts which vary with the gloss and the directions of observation and illumination of any specimen. Thus the color of a specimen tends to vary with the directions in which it is illuminated and viewed. These directions must therefore be standardized in any method for measuring color. Similarly, the geometric conditions of any gloss measurement must be carefully standardized if one is to duplicate the gloss measurements of others. There are not one, but several different scales of gloss measurement. Each is used to represent the glossy appearance of a material or group of materials of somewhat similar appearance.

9:00 A.M. PACKAGING MATERIAL TESTING SESSION
(East Ball Room) George R. Sears, Chairman

1. A METHOD FOR LOCATING POINTS OF GAS LEAKAGE IN PACKAGES AND PACKAGING MATERIALS—H. H. Hartwig

Difficulties have been encountered in developing packages affording high levels of protection, due to variations in permeability to gases and water vapor. Resulting variations in packaging results pointed to the need for a method of detecting flaws and leaks in packages and packaging materials. Such a method has been developed, based on the formation of a brown stain at points where $SnCl_2$ solution, applied to one side of the test material, comes in contact with H_2S gas diffusing through flaws from the other side of the material.

A cell is constructed of the test sheet or package which permits introduction of H_2S gas under slight pressure to one side of the assembly. A solution of $SnCl_2$ is then painted over the entire opposite side of the sheet or package. The formation of brown stains of SnS at any point indicates the penetration of H_2S at such points. The location and rate of formation of the stains indicate the position and comparative size of pin holes and other flaws in the test material. A permanent record of the result may be obtained by flushing out the H_2S and washing off unreacted $SnCl_2$ before the cell is disassembled.

This method is a useful tool in determining location and degree of gas leakage with flat sheets, bags, or overwrapped packages. It is also useful in determining at what point during converting or construction of the package, rupture or voids appear so that the cause of failure can be eliminated.

2. USE OF OTTAWA TEST SAND IN THE EVALUATION OF SEALED FLEXIBLE PACKAGES—L. C. Cartwright

3. THE EFFECT OF THE ADHESIVE ON THE QUALITY OF FIBERBOARD—Ralph E. Green, Robert H. Sams, John H. Wills

The quality of fiberboard depends on the adhesive, the paper, and the manufacturing technique. Improved methods of judging the quality before fabrication should lead to improved adhesives and techniques. The measurement of the bond strength of corrugated board has not been standardized. Previous methods required either too much manipulation or too much possible human or mechanical error to be readily accepted. Revised equipment based on the separation of a chosen liner from corrugated medium by a tensile pull on steel pins inserted in alternate flutes has reduced the time required and the expected experimental error. Data from preliminary tests show that the pins available give a maximum bond strength at about 1 inch width and stiffer pins are desirable. The natural variation in the tensile strength of the paper or the paper-adhesive bonding layer appears to be greater than the experimental error. An attempt to correlate bond strength data with performance and other tests such as column compression tests should be made.

4. POSTWAR DEVELOPMENTS WITH EMULSIFIED ASPHALT SIZING IN CYLINDER BOARDS —E. M. Lorenzini

The history of emulsified asphalt from its wartime hard sizing uses through the transition stage to present day domestic uses is given briefly.

Asphalt emulsions were used to produce boards which would withstand the 24-hour immersion test. They are now used for the slack sizing of kraft and jute liner boards, chipboards, and various insulating boards. Color has not presented a problem in that the basic raw materials are brown in color though discoloration is apparent when the emulsions are added to light-colored liner stocks.

The cost of sizing with 1 to 2% of asphalt solids based on weight of fiber is given at $1.00 to $2.00 per ton of finished board.

5. METHOD FOR EVALUATING THE FUNGICIDAL PROPERTIES OF TREATED PAPER AND PAPERBOARD—B. F. Shema

Because of the interest in mildew resistant papers, a standard test method for evaluating the fungicidal properties of the product was developed. An inoculum prepared by inoculating a culture medium with a test organism (*Chaetomium globosum* or *Aspergillus niger*) is applied to the surface of the sheets to be tested. The fungicidal properties are then judged by the

amount of growth, or lack of growth, on the test specimen.

9:00 A.M. MECHANICAL PULPING AND STRUCTURAL FIBROUS MATERIALS SESSION (Room B-C)
R. M. Drummond and John F. Campbell, Chairmen

1. GRINDING OF QUAKING ASPEN FOR USE IN PRINTING PAPERS—Axel Hyttinen, G. E. Mackin, E. R. Schafer

Quaking aspen was among the first species to be used in the groundwood process of pulping wood, but its use never developed to large proportions for this purpose because of the abundance of more preferable species, such as spruce, balsam, and hemlock. Now with diminishing and disappearing supplies of the preferred species, aspen is again being used in increasing quantities. Although small amounts have been used for groundwood pulping for many years, the amount of technical information available on the subject is relatively limited.

Groundwood pulping experiments made at the Forest Products Laboratory have shown that a dull stone surface condition is preferable for the production of pulp in the freeness range used for printing papers. For a given pressure pulp of higher strength can be produced on a duller stone surface, and for a given quality the production rate is higher and the energy consumption is lower than on a sharper stone surface.

At a stone surface speed of 3,468 feet per minute, the principal effect of increasing the grinding temperature (from 125 to 155 to 185° F.) was to increase the freeness of the pulp produced. This effect was less pronounced with a dull stone surface condition than a sharp one. At a stone surface speed of 4,185 feet per minute, there appeared to be no important effect on the grinding characteristics of the wood or the pulp properties that could be attributed either to increasing the temperature (from 150 to 165 to 185° F.) or to increasing the consistency (from about 1.8 to about 3.5 to about 5.0%). Pulps produced at these two speeds at comparable stone surface conditions, pressures, and temperatures did not always follow the same trends in regard to pulp properties, energy consumption, and production rate, although higher speed favored higher freeness in the majority of cases.

A comparison of spruce and aspen ground under the same conditions showed a higher energy consumption, a lower grinding rate, higher strength, lower freeness, and shorter average fiber length for the spruce than for the aspen. It was indicated that to produce pulps of equal strengths, aspen would require much higher energy consumption than spruce.

Aspen groundwoods made under each of five stone surface conditions were used in three different furnishes for book-grade printing paper. Although the wet-web strength was low, no significant changes in paper machine operating conditions were required to make these runs when compared with conditions established for a standard commercial book furnish. In general, the use of aspen groundwood tended to produce a well-formed sheet having good appearance. The tests also indicated that the use of aspen groundwood generally tended to produce paper with a higher density and lower porosity, opacity, and strength than when spruce groundwood was used. A few exceptions, however, were observed. For instance, paper containing aspen pulp made on a relatively dull stone surface had relatively high tensile and bursting strength, although the tearing strength and porosity were somewhat lower than desired.

Sample rolls of some of these experimental papers were coated, supercalendered, and printed on laboratory equipment. Results of these tests indicated that aspen groundwood did not impair the printability of the paper. It was observed, however, that the low porosity of the experimental papers reduced the amount of coating that could be applied to the sheet. It is believed that this objectionable characteristic can be overcome by varying the amounts and types of pulps in the furnish.

2. PRODUCTION OF SEMICHEMICAL PULP IN THE CHEMIPULPER—R. D. Kehoe

3. AN OUTLINE OF THE INSULATION BOARD INDUSTRY—Carl G. Muench

Practically every kind of material that is light in weight and has some strength has been used or is still being used as protection against heat and cold. These include materials such as sawdust, straw, cornstalks, vegetable fibers such as wood and bagasse, mineral fibers such as asbestos and glass wool, and also natural mineral materials such as pumice, diatomaceous earth, and vermiculite.

Cabot's Quilt was among the first insulating materials to be made commercially and the first semirigid insulation felt was Flaxlinum, a product made from flax straw. Insulite, the first rigid type, was developed in 1914.

The Celotex Company was organized in 1920 to make insulation board from bagasse.

The equipment required to manufacture insulation board includes (1) pulping units, (2) board machines, (3) drying equipment, and (4) finishing and packaging equipment.

4. PENETRATION OF WATER IN INSULATION BOARD—Willmer A. Wink, J. A. Van den Akker (by title)

The purpose of this investigation was the development of a more satisfactory method for determining the liquid water resistance of insulation board sheathing. The dry-indicator test which is currently employed to measure this property of insulation board has been found in use to have practical shortcomings and this investigation shows that it is defective from a fundamental point of view. In addition to the highly subjective nature of the test and the indefiniteness of the end-point, it was found by the hygroscopic nature of the indicator causes the test to be greatly influenced by water vapor. In actual tests performed on samples of insulation board with the dry indicator method, end-points (as judged by typical color change) were obtained with specimens which were exposed only to water vapor at high relative humidity.

5. EXPERIMENTS ON THE PRODUCTION OF INSULATING BOARD AND HARDBOARD FROM WESTERN SAWMILL AND LOGGING WASTE—S. L. Schwartz, J. C. Pew, E. R. Schafer (By title)

This report describes experiments on sawmill and logging wastes from western woods for the production of insulating boards and hardboards. The work included a limited investigation of several procedures for the preparation of the coarse-fibered pulps and the determination of the suitability of several species and forms of waste for these products.

Eight samples of sawmill and logging wastes and three mixtures of equal parts by weight of some of the wastes, as given in the following list, were tested.

1. Western hemlock slabs and edgings.
2. Western hemlock hogged planer ends.
3. Western hemlock hogged veneer waste.
4. Douglas fir slabs and edgings.
5. Douglas fir hogged planer ends.
6. Douglas fir hogged veneer waste.
7. Douglas fir planer shavings.
8. White fir cordwood (logging waste).
9. Mixture of Douglas fir old-growth slabs and edgings and Western hemlock slabs and edgings.
10. Mixture of Douglas fir old-growth slabs and edgings and Douglas-fir second-growth cordwood (logging waste).
11. Mixture of Doulas fir old-growth slabs and edgings and white fir cordwood.

Limitations on the project precluded an extensive study of cooking processes and milling treatments. However, one of the wastes, Western hemlock slabs and edgings, was selected for a variety of treatments as follows:

1. Soaking in water.
2. Steaming at elevated temperatures and pressures.
3. Digesting in water at elevated temperatures and pressures.
4. Digesting in neutral sodium-sulphite solution at elevated temperatures and pressures.
5. Digesting in caustic-soda solution at elevated temperatures and pressures.
6. Digesting with lime and water at elevated temperatures and pressures.

The other wastes were digested by a single process only, that is, steaming for ½ hour to a maximum temperature of 180° C. and ¼ hour at that temperature.

Results of various treating methods used on Western hemlock slabwood may be summed up as follows:

1. Boards produced from disk-milled uncooked wood are likely to be, at best, marginal in strength properties.

2. For simplicity of process and strength of product steaming appears to have an advantage over the other cooking processes. Steaming appears particularly advantageous for hardboards. Due to the organic acids evolved, a digester with some degree of corrosion resistance would be required for the cooking operation.

3. For these products, water cooking has no special advantage over steaming and would be more costly.

4. Cooking with 5% caustic soda (based on wood charged) would be satisfactory for insulating board, although a higher energy consumption in milling than with steamed and water-cooked chips is indicated. The only advantage of the caustic-soda treatment over steaming is that ordinary steel digesters could be used. The results obtained by cooking with 2% of caustic soda indicate this to be an insufficient amount of chemical.

5. An experiment with a 4.2% sodium sulphite and 0.8% sodium bicarbonate (calculated as carbonate) indicates these amounts of chemicals to be insufficient to insure a good margin of strength with this type of digestion, but that 7 to 8% of total chemicals should suffice. The energy consumed in milling the stock was very high. Neutral sulphite liquors, however, have the advantages of being noncorrosive to ordinary steel and of producing relatively light-colored boards.

6. More than 2% of lime and longer cooking time than with the other cooking processes are indicated for this type of cook.

By the steaming process, acceptable insulating boards and hardboards were obtained from Western hemlock slabs, edgings, and veneer wastes, and white fir logging waste. Less promising results were obtained from the Western hemlock planer ends, apparently because of the bruised condition of the hogged material. Boards produced from the Douglas fir wastes were of marginal or submarginal quality, especially those made from the hogged planer ends. The Douglas fir planer shavings, a finely divided type, alone were wholly unsuited for the purpose.

6. ADDITIONAL DATA ON THE RECOVERY OF WET PULP MATS FROM COMPRESSIVE DEFORMATION—C. O. Seborg. F. A. Simmonds (By title)

At constant temperature, the recovery values for wet fiber mats from compressive deformation were little affected until the surface tension of the suspensions was reduced to about 60 dynes per centimeter, but further reduction resulted in marked, though variable, effects. Irrespective of the effect on the recovery value, a decreased surface tension always resulted in a decreased shrinkage of the test mat upon drying in air. The surface tension of ordinary pulp suspensions is the range where recovery values are not affected.

At the same surface tension and temperature, different wetting agents, although not at the same concentration, resulted in different recovery values. This is taken to indicate adsorption of the wetting agent and its influence on the recovery values by a change in the condition of the external fiber surface.

At constant surface tension and variable temperature, no consistent trends were found, recovery values for some pulps increasing with increasing temperature, others decreasing, and some remaining unchanged.

As duration of compression was increased, the recovery of unbeaten and slightly beaten pulps was reduced considerably and in about the same degree, but the effect became progressively less with increased beating. These increases in degree of plastic deformation were indicated by the results of recovery determinations made on screen classified size fractions from a beaten pulp and also from groundwood pulps to be due to "fines" in combination with longer fibers. The fact that groundwood pulps have lower recovery values than sulphate and sulphite pulps is also due to the larger percentage of fines in the groundwood pulps.

It was confirmed that sulphate pulps are, in general, higher in recovery than sulphite pulps.

7. EFFECT OF PREIMPREGNATION, PULPING DEGREE, AND PULPING TEMPERATURE IN SEMICHEMICAL PULPING—E. L. Keller, J. N. McGovern (By title)

Quaking aspen chips were pulped semichemically at the Forest Products Laboratory using sodium sulphite-sodium bicarbonate liquors to determine the effects of preimpregnation, degree of pulping, and pulping temperature on pulp yield and properties.

The use of a preimpregnation stage in semichemical pulping to 85% yield resulted in uniformly softened pulps and pulps that were somewhat lighter in color and had higher strength properties than pulps obtained from conventional one-stage digestions using adequate amounts of chemical. In pulping to 75% yield with adequate chemical, preimpregnation also resulted in pulps lighter in color but otherwise equal in strength properties to pulps made by one-stage pulping.

In pulps produced in the range of 62 to 86% yield, the holocellulose, Cross and Bevan cellulose, and alpha-cellulose contents increased; the lignin contents decreased; and the strength properties increased as the pulp yield decreased. The holocellulose values were higher than the Cross and Bevan cellulose values by an approximately constant amount of 4%. The holocellulose yield and the yield of alpha-cellulose from it decreased almost linearly as the pulp yield decreased. The viscosities of these carbohydrate fractions also decreased with decreasing yield. For the same yield, the pulping time was shortened by using a cooking liquor having a relatively high concentration and containing chemical in excess of minimum requirements for pulping.

In pulping to yields near 65 and 85%, an increase in pulping temperature of 10° C. in the range of 155 to 175° C. shortened the time for the same degree of delignification by slightly more than one-half. Lower temperatures resulted in slightly higher yields for the same chemical consumption than higher temperatures. The properties of the pulps were not affected by the pulping temperature.

9:00 A.M. Acid Pulping Session (West Ball Room)
G. H. McGregor, Chairman

1. MODERN SULPHITE ACID MAKING — Thomas Gerace

A description is given of the acid making process used at the mill of the St. Regis Paper Company at Deferiet, New York. The installation is the Chemipulp—Kimberly-Clark acid making system.

The units including sulphur burners, cooling systems, acid towers, and the recovery system are designed for 125-ton daily production. Details are given on the construction and operation of the system.

2. YIELD AND QUALITY OF PULP AND WASTE LIQUOR IN SULPHITE PULPING OF SOFTWOODS—M. Baum, J. W. Bard, J. R. Salvesen, G. J. Brabender

Experimental pulping of Eastern hemlock was carried out to establish the influencing factors on yield of lime-precipitated lignin from the resulting waste sulphite liquors. Data were obtained on yield and bleachability of the corresponding pulps. The pulping variables investigated included: unreacted and combined SO_2, cooking time, and maximum temperature. Results given in curves for pulps having permanganate numbers of 16.9, 12.7, and 8.4 show that the highest yield of precipitated lignin is obtained when processing liquors from pulps having the lowest permanganate number. When liquor from pulps of low permanganate number is processed the recovery of lignin is practically unaffected by composition of cooking acid or maximum temperature over the range studied. When pulp of higher bleachability is produced, lignin recovery is more favorable at lower concentrations of unreacted SO_2 and, to a lesser extent, at lower combined SO_2 in the cooking acid. Tables are given showing per cent distribution of lignin in (a) pulp (b) irrecoverable waste liquor (c) lime-precipitated fraction and (d) effluent from recovery process. These results are shown for typical sulphite cooking conditions producing pulps with three different bleachabilities.

Effect of the same cooking variables on yield and bleachability of Eastern hemlock pulp are given in curves which show trends in agreement with results previously reported by others.

Similar trends are indicated for both lignin recovery and pulp properties on studies now in progress on sprucewood.

3. PRODUCTION OF FODDER YEAST FROM WOOD SUGARS CONTAINED IN SULPHITE WASTE LIQUOR AND WOOD HYDROLYZATES—Elwin E.

Harris, Martha L. Hannan, Ralph R. Marquardt

Sulphite waste liquor may be the source of carbohydrates upon which to produce a food yeast for either humans or animals. Sulphur dioxide is removed by steam stripping or by precipitation with lime. The resulting solutions are neutralized to a pH of 4 to 4.5, nutrients added, and then inoculated with a yeast of the Torula type. Sulphite waste liquor is sterile and therefore suitable for continuous propagation of yeast. One of the most serious problems is the tendency of excessive foaming. This may be overcome by the use of a mechanical device which allows the gas bubbles to break as the liquid falls down a central draft tube.

Sulphite waste liquor which has been steam stripped to remove the sulphur dioxide is then neutralized to ph 4.1 with lime and filtered. Sulphite waste liquor neutralized directly with lime to 4.1 and filtered, liquor which had been concentrated to 40% total solids, and magnesia-base sulphite waste liquor have been used to propagate yeast. The rates of growth in these liquors have been compared with the rate of growth in sugar solutions produced by the hydrolysis of wood.

4. THE TANNING PROPERTIES OF LIGNOSULPHONATES PRODUCED BY DIFFERENT COOKING CONDITIONS—M. A. Buchanan, Robert M. Lollar, Donald D. Niemeyer

Aspen and spruce wood were cooked under controlled conditions in order to determine the effect of cooking variables and wood species on the tanning properties of the resulting sulphite waste liquors. From a leather-making standpoint none of the sulphite waste liquors were very satisfactory. They are low-affinity materials and produce empty leathers. However, the wood cooked and the cooking conditions definitely influenced the leather-making characteristics of the liquors. The aspen liquor had the poorest tanning characteristics and can scarcely be said to tan at all, even though it is taken up by hide substance. The best liquor was that obtained by cooking spruce under conditions used to produce rayon pulp. The latter liquor may be said to give a low grade tannage.

Contrary to Gustavson's findings, low pH tannages are not necessarily optimal for lignosulphonates, nor do the latter always act as disaggregating agents for collagen. This discrepancy may be due to the fact that Gustavson's conclusions were based largely on results with fish skin, whereas calf skin was used in the present study.

The desirability of lignosulphonates for leather making appears to correlate directly with their precipitability with high molecular weight amines, such as beta-naphthylamine. This suggests that the larger molecular weight fractions are more desirable. The work is being continued to learn more about the characteristics of the reactions between lignosulphonates and hide substance, so that they may be developed into better tanning materials.

2:00 P.M. Optical Properties and Inter-Society Color Council Session (Grand Ball Room)
A. H. Croup, Chairman

1. SPECTROPHOTOMETRY—Norman Barnes

2. THE I. C. I. STANDARD OBSERVER AND COORDINATE SYSTEM AND THEIR USE IN STUDIES OF THE COLOR OF PAPER—J. A. Van den Akker

Spectrophotometric data in the form of spectral reflectance curves ("color curves") are most useful in connection with mill control of color and in fundamental studies of color. However, it is sometimes necessary or desirable to obtain accurate numerical expression of the color, or of a color difference, corresponding to a color curve or pair of curves. An objective and accurate psychophysical bridge between purely physical data and color sensation is afforded by the I.C.I. standard observer and coordinate system. The I.C.I. system is described, with particular reference to reflecting bodies (such as paper) and transparent bodies. Some applications of the I.C.I. system to problems in the paper industry are discussed.

3. INTERRELATION OF COLOR SPECIFICATIONS—Dorothy Nickerson

4. COLOR ENGINEERING—Frederick H. Rahr

2:00 P.M. Package Materials Testing (East Ball Room)
George R. Sears, Chairman

1. THE GRAVIMETRIC (WEIGHED-CELL) METHOD OF DETERMINING WATER VAPOR PERMEABILITY—F. T. Carson

Most measurements of water vapor permeability in the last 20 or 30 years have been made by the gravimetric (weighed-cell) method. The evolution of this method is outlined, including a discussion of such topics as the following: method of sealing; defining the area; diffusion and ventilation; condensation of moisture; desiccant in cell; vapor-pressure and moisture gradients; steady state of transmission; use of counterpoise; accelerating the test; and agreement among common methods.

The consensus of the better technics seems to require a wax seal completely enveloping the edges of the specimen and defining a predetermined test area by casting the wax around a template; a desiccant or a source of water vapor within the permeability cell close to the specimen, and a well ventilated room, cabinet, or oven at constant temperature and humidity in which to expose the cell. There is a tendency to limit the higher humidity to 90% to 95% to avoid condensation and other irregularities at very high humidities. There is also emphasis on weighing the cell in the atmosphere in which it is exposed.

Some data from previously published reports are combined to show how permeability results by different gravimetric methods may be expected to agree.

Included in this presentation are lists of water vapor transmission rates for some representative types of frozen food containers and for materials commonly used in package construction. These rates are profitably used in comparing different types of containers and in evaluating construction variables. Greater benefits could be realized, however, if water vapor transmission rates were correlated with the actual effects of extended storage at commercial conditions as observed in product packs.

2. POLYTECHNIC INSTITUTE OF BROOKLYN METHOD—W. H. Aiken

3. THE TRANSMISSION OF ODOR THROUGH PACKAGING MATERIALS—L. W. Elder

A method is described for rapidly measuring water vapor permeability of nonsorbing barriers at low temperatures. Factors affecting the measurement of water vapor transmission rate at low temperatures are discussed. These include: reduction of vapor pressure at reduced temperatures, effect of temperature on inherent transmission characteristics of barriers, and water absorbing characteristics of barrier and how they are affected by temperature.

4. A FLOW METHOD FOR DETERMINING WATER VAPOR PERMEABILITY AT 0°F.—Frederic H. Cherepow

An adaptation of the isostatic method developed by Davis for determining gas permeability is used to measure water vapor permeability over a wide range of temperature and vapor pressure differences, with particular emphasis on studies at lower temperatures, e.g., 0°F.

In this flow method, air, saturated with water vapor at 0°F., is passed at a known rate over one side of a series of test sheets held in a diffusion cell maintained at 0°F. Air, dried to essentially 0% relative humidity at 0°F., is passed over the other side. The water vapor in each effluent air stream is continuously absorbed in desiccant and determined gravimetrically. Permeability is measured by the rate of gain of water vapor in the dry air. Comparison of total water vapor in both air streams on exit from the cell with the theoretical amount in the entering air serves as a check on the accuracy of the determination. Test sheet areas up to 2283 square centimeters and test periods up to 24 hours or longer are used to increase the sensitivity of the method when testing sheets of low permeability.

Features of the flow method are: (1) The flow of air over both sides of the test sheets avoids stagnation. (2) Large testing area permits the reduction of testing time to reasonable values. (3) Permeation rate is determined by gravimetric analysis, where absorption and subsequent weighings are conducted at room temperature (70° F.). Therefore, the test assembly is not subjected to undesirable wide temperature-humidity fluctuations.

5. APPLICATION OF THE ELECTRIC HYGROMETER IN THE DETERMINATION WVP AT LOW TEMPERATURE—J. A. Van den Akker

6. A METHOD FOR THE DETERMINATION OF WATER VAPOR PERMEABILITY AT LOW TEMPERATURES—S. A. Pierce, J. F. Helms

A testing method and apparatus are described for the determination at low temperatures of the water vapor transmission rates of frozen food containers and sheet materials. Advantages are claimed for this method in rapidity and in freedom from the error caused by moisture condensation which is inherent in methods in which the test specimens are removed from storage during the determination.

The proposed test procedure consists of placing a source of water vapor inside a test container or cup, sealing the sample in an impermeable cell stored at 0° F., and passing a controlled current of dried gas through the cell to remove mechanically the water vapor emanating from the sample. The water vapor is then absorbed by a dessicant and determined gravimetrically at regular intervals. When the accumulated gains plotted against time show a straight line relationship, the water vapor transfer rate is calculated from the slope of this line. Tests are usually completed in a hundred hours.

2:00 P.M. Pulp Purification Session (West Ball Room)
W. D. Harrison, Chairman

1. BLEACHING PULP WITH MIXTURES OF CHLORINE AND CHLORINE DIOXIDE—G. P. Vincent

The use of mixtures of chlorine and chlorine dioxide obtained from a chlorine dioxide generator for bleaching sulphate pulp to exceptionally high brightness with retention of strength is described. Comparative results on Northern, Southern, and Swedish sulphate pulp with chlorine-chlorine dioxide mixture, pure chlorine dioxide, and hypochlorite are discussed. Conclusions are that a mixture of chlorine and chlorine dioxide is equivalent in results to pure chlorine dioxide and in addition brings about operating economies. Hypochlorite bleaching shows, as would be expected, excessive degradation in final bleaching stages compared with the use of a chlorine dioxide solution with or without chlorine.

A Northern kraft bleached in three stages to a brightness of 68 to 70 G.E. is treated with 0.5 and 1.0% available chlorine as pure chlorine dioxide and as a mixed gas containing a molar ratio of chlorine and chlorine dioxide shows a brightness increase of 10 to 13 points without appreciable degradation as measured by the TAPPI cuprammonium viscosity procedure in both cases. Experiments were made at a pH of both 6 and 9 at a temperature of 40° C. for a total time of 2 hours. There was obtained a slightly higher brightness from the use of a mixed gas compared with chlorine dioxide alone.

A Southern kraft was treated in a similar manner to the above and also showed results favoring the use of the mixed gas.

Excellent strength retention and brightness were obtained on Swedish kraft using the mixed chlorine-chlorine dioxide gas. The initial pulp at a brightness of 82.7 G.E. was treated at a pH of 6.4 and 8.3 with a 0.5% total available chlorine as chlorine dioxide and chlorine. The brightness was increased to 86.7 with excellent strength retention.

It is pointed out that the production of a mixture of chlorine and chlorine dioxide is more economical per unit weight available chlorine than the production of pure chlorine dioxide.

2. CHLORITE BLEACHING OF SOUTHERN PINE KRAFT PULP—W. P. Lawrence

Sodium chlorite was investigated as a finishing bleach for raising southern pine kraft pulp from G.E. brightness 60 to 70 to 80 to 84. With a given initial brightness, predried pulp yielded a few points higher ultimate brightness than slush pulp. Alkaline (hypochlorite activated) chlorite under proper control gave results about equal to those obtained with acid activated chlorite. Alkaline chlorite consequently was employed because of its greater adaptability to existing mill equipment. Both types of chlorite were materially superior to hypochlorite in preserving strength characteristics of the pulp, but not in degree of ultimate brightness attained. Of the several process variables investigated, pH and ratio of hypochlorite to chlorite appeared to be the most important in alkaline chlorite bleaching. Alkaline chlorite bleaching of predried pine kraft pulp in beaters on mill scale was carried out over an extended period of time with generally satisfactory results.

3. COMPARATIVE STUDIES IN THE CHLORINATION OF WOOD PULP—Oliver S. Sprout, Jr., Thomas W. Toovey

Bleached sulphate and sulphite pulps have been prepared through bleaching methods which have included procedures characterized by single-, two-, or three-stage chlorination. The procedures have differed from each other with respect to the quantities and distribution of the chlorine in the chlorination stages, and the sequence of the chlorination and alkali extraction stages. Final bleaching has been accomplished by suitable hypochlorite and acidification (SO_2) stages as necessary.

These studies have indicated that pulp has been most effectively and economically bleached when chlorinated to an optimum degree which was characteristic of the pulp and the procedure for bleaching, although the limits for chlorination by various procedures have fallen within a narrow range. The products from the chlorination of sulphate pulp have been found to be less readily soluble in aqueous acidic medium than those of sulphite pulp so that adjustment of the duration of the chlorination has been required in some instances.

The necessity for introducing an alkali extraction stage between two chlorination stages has been demonstrated.

A three-stage chlorination procedure employing recycled chlorination liquors for sulphate pulp bleaching has afforded reduction in operating time as well as in charges for bleaching chemicals over a single stage chlorination bleach and, to a lesser extent, over a two-stage chlorination bleach when producing pulps of comparable brightness and physical properties.

4. THE COLD ALKALINE PURIFICATION OF WOOD CELLULOSE I. Some Effects of Bleaching and Acid Hydrolysis on Resistant Pentosans—Alexander Meller (By title)

The significance of resistant pentosans in wood pulps, and the nature of their association with cellulose, are outlined in the light of existing views.

The results are presented of experiments designed to decrease the resistant pentosan fraction in softwood pulps by means of hypochlorite bleaching (oxidation), and by acid hydrolysis.

Hydrolysis of prebleached wood pulps with acid solutions, and treatment of prebleached pulps with hypochlorite solutions, yielded products with similar viscosities in cuprammonium solution. A greater percentage of material was removed by cold 7% sodium hydroxide solution from the bleached than from the acid hydrolysed pulps. The bleached pulps contained less resistant-pentosans than the hydrolysed preparations for the same solution viscosity in cuprammonium.

The depolymerisation of carbohydrates in wood pulps and then dissolution by 7% alkali solution are discussed.

Wednesday, February 26, 1947

9:00 A.M. Statistics Session Room B-C)
T. A. Pascoe, Chairman

1. QUALITY CONTROL FOR THE PULP AND PAPER INDUSTRY—Charles A. Bicking

Quality control is as old as the pulp and paper industry. However, the industry no longer relies on the old rule-of-thumb methods of control. Never-the-less, there are weaknesses in present technical controls which practical men have long recognized. For example, there is a need for objective product quality goals and customer specifications. Routine tests should be more uniform and rational methods for judging results should be available.

Such men as John B. Catlin and Ralph J. Knoll have been working in the pulp and paper industry with the quality control methods which have been proven so successful in related industries. The basic tool, the control chart, has the advantage of being so simple that it can be used and interpreted by any intelligent operator or foreman.

The original measurements of basic weights of samples of

material sheeted on a fourdrinier machine may be arranged in various ways to give at a glance progressively greater amounts of information about the process. Thus, a line chart, an ungrouped frequency distribution, a grouped frequency distribution, a frequency distribution curve, and a distribution of averages of sub-groups of the data are steps toward the most effective means of presenting the process data. Finally a quality control chart provides the most effective means of studying the process and indicates when action should be taken to correct any assignable causes of excessive variability.

When applied to a production run of book paper, it was possible to obtain results which gave a satisfactorily high bursting strength result. Control charts were used during two preliminary runs to iron out irregularities in the process which made possible a very uniform, high grade result on the main run.

By means of a second set of charts, basis weight of the sheets was related to the bursting strength results with greater knowledge of the performance of the machine resulting.

The use of control charts and other quality control methods extends beyond the general problem of product quality. They are used to supplement judgment and experience in raw material acceptance, product specification, quality reporting, process and laboratory experimentation, test measurement, instrument calibration, and operator quality training.

2. METHOD FOR EVALUATING AND REPORTING PRODUCT QUALITY—J. B. Catlin, J. G. Strieby

Management's knowledge concerning many important quality questions depends largely on the subjective judgment of individuals. One method for minimizing management's problems in this regard is provided by a statistical procedure which results in a total quality index. The index described here is called the "Normal Quality Report" and depends basically on the same concepts used in cost accounting work. In cost accounting all items are transformed to a common cost measure, the dollar. In this quality index all quality items are transformed to a customer experience scale using a quality measure, the demerit. In addition to providing a measure of quality and means for comparing quality in time, by mills, by grades, by suppliers, etc., this index takes unavoidable sampling fluctuation into account. The index is particularly useful to top management but can be adapted readily to the specific needs of manufacturing, sales and purchasing staffs.

3. THE VARIABILITY OF STRENGTH TESTS ON FIBERBOARD—Geoffrey Beall, R. C. McKee

In a number of sections of kraft B-flute board, an exhaustive examination was made of General Electric puncture and bursting strength; similarly, on rolls of the liner, determinations had been made of Riehle compression, stretch, Elmendorf tear, and Amthor tensile. When, for such test values, allowance is made, within a section or roll, for changes that occur with position in the machine direction or across the machine, residual or chance variation remains. The chance variations for all six tests proved to be distributed in nearly normal or Gaussian fashion. Such distribution justifies the use of most usual statistical analyses of the date. Examples of such analyses are given in tests of the significance of directional effects and recommendations for sampling.

4. SOURCES OF VARIABILITY IN WATER VAPOR PERMEABILITY DETERMINATIONS—Maynard S. Renner

Wartime and postwar developments have given increasing importance to the problem of protecting packages from penetration of water vapor, and hence to the problem of measuring rate of transmission of water vapor through a packaging material.

The cup test is widely a used procedure for measuring this characteristic. The material to be tested is sealed across a cup containing desiccant, exposed to high temperature and humidity, and the gain in weight with time determined as a measure of the amount of water vapor transmitted. There is considerable variability in this test, and this paper is concerned with the results of a designed test conducted to learn more about the source and magnitude of this variability.

A special cabinet operating at 100° F. and 90 to 92% relative humidity (TAPPI T464m-44) was used with a special cup (exposed area 5.81 sq. in.). Synthetic Pliofilm was used as a membrane. Fifteen cups were prepared and positioned at regular intervals throughout the cabinet to give a measure of the contribution to total variability of both shelves and position on shelves. After a conditioning period, weighings were made for six successive days giving a total of ninety weight-gain values.

The mean of these ninety values gave a water vapor transmission rate (WVP) of 0.52g./100 sq. in. which corresponds with WVP values obtained for the same film by other laboratories indicating that WVP values can be checked when large samples are used, but detailed scrutiny of the data shows much variability.

This variability is studied by means of variance analysis. The days were found to be the most important source of variability, when the F test was applied days, positions, and layers were found to make significant contributions to the variability. The interaction between positions and layers also had a significant effect. The joint effect of days and positions was not significant and the joint effect of days and layers was of questionable significance. The triple interaction term was small, indicating that the error of the experiment (other than the variability assignable to days, layers and positions) was small and that the film tested was uniform.

The variability due to days is ascribed to daily variation in the temperature of the room in which the cabinet was stored. The position and layer variability are believed to be caused by variation in circulation of air within the cabinet.

This experiment has resulted in giving a better knowledge and understanding of the source and magnitude of the variability of WVP determinations.

5. NOMOGRAPHIC TREATMENT OF THE RESULTS FROM THE CUPRIETHYLENEDIAMINE METHOD OF DETERMINING THE VISCOSITY OF CELLULOSE—Geoffrey Beall (By title)

As a rapid and convenient means for determining the viscosity of a solution of cellulose, Levy, Muffat, and Harrison *(1)* suggested that a suspension of pulp be used, the concentration of which is not highly controlled, although accurately determined, and submitted a relationship permitting correction to a basis of 1% suspension. This procedure is well suited to mill conditions and seems to have come into wide use. The authors suggested that tables appropriate to the problem be prepared but the present work suggests and presents a nomogram. The nomogram is more easily used than a set of tables.

6. QUANTITATIVE TREATMENT OF A DENSITY DISTRIBUTION PATTERN ON PHOTOGRAPHIC PAPER AS PRODUCED BY THE DISTURBANCE OF A SPOTLIGHT GALVANOMETER—Geoffrey Beall (By title)

In studies on papermaking, problems of uniformity arise and their treatment may be of general interest. The present account treats data that arose in the course of studies on deflocculation, as found in a number of aqueous pulp suspensions. In the first place, the experimental results were obtained in the form of an optical density record on photographic paper, where there was greater density in a central region and progressively diminishing density on either side. A simple numerical quantity to characterize each record and, hence, to characterize the lot of pulp represented is determined.

9:00 A.M. DEINKING AND ALKALINE PULPING SESSION
(West Ball Room) Frederic C. Clark, K. G. Chesley, Chairmen

1. ALKALI AND HEAT RECOVERY IN DEINKING SYSTEMS—H. P. Bailey, A. H. Nadelman

Several authors have shown the possibility of reusing waste liquor from the deinking of paper. A large part of the alkali is left in the waste liquor after deinking of stock since alkali-reactive materials in the paper are present only in small quantities.

Hot water extractions and laboratory deinking experiments on several different types of papers show that actual consumption of alkali is in the range 0.24 to 0.90% based on the weight of paper as received. This is less than one fourth of the amount of alkali added in the conventional methods of deinking. Further laboratory experiments show that the alkali in mill waste liquor can be reused for deinking and that it is possible to maintain the total alkalinity by the addition of small amounts of caustic before the liquor is used again.

If waste paper is deinked in a low density circulating system at 4% consistency and a cooking temperature of 170°F. with 4% of caustic soda based on the weight of the paper, it should be possible to effect economies in alkali and steam costs of about 70 and 50% respectively. These calculations are based on figures taken from the literature and do not represent production records of any particular mill.

2. MODERN RECAUSTICIZING PLANT PRACTICE—Robert L. Clemens

This paper discusses the most important factors governing the design and operation of a modern continuous recausticizing plant at a typical kraft pulp mill. The flowsheet is broken down into its component steps or unit operations and the subject matter is developed under such headings as lime slaking, classification, causticizing, white liquor clarification, lime mud washing, green liquor clarification, and dregs washing.

The paper is well implemented with design data, operating results, and facts and figures obtained at several dozen plants of this type built within the last few years. For example, it is recommended that reburned lime be slaked with clarified green liquor for 10 minutes at 200°F.; that all inert material coarser than 65 mesh be classified out; that causticizing time be held to at least 1 hour, preferably 1½ hours; that 16 sq. ft. of settling area per ton of lime mud be provided in the white liquor clarifiers; and that two stages of lime mud washing be provided in order to insure that the lime mud reburned in the kiln shall contain no more than 0.5% Na_2O.

A portion of the paper deals with the lime and filters and the rotary kilns to complete the cycle of the closed recausticizing system. Reference is also made to the correct use of instruments and operating controls. A diagrammatic flowsheet is included showing the solution and soda balances in a typical recausticizing system serving a kraft mill with a pulp capacity of 200 tons per day.

3. THE REMOVAL OF SALT CAKE FUME FROM SULPHATE RECOVERY FURNACE STACK GASES BY SCRUBBING—T. T. Collins Jr., C. R. Seaborne, A. W. Anthony, Jr.

A new apparatus for scrubbing the fume of sodium salts from sulphate or soda furnace stack gases has been developed successfully on a pilot plant scale. The equipment consists essentially of a venturi through which the waste gases going to the stack pass at high velocity while, at the same time, recirculated water injected into the construction is atomized by the energy of the gases under the extremely turbulent conditions existing in the throat and is then removed in a dry cyclone following the venturi atomizer. Efficiencies of sodium removal of as high as 99% have been attained by a combination consisting of the venturi atomizer followed by the conventional Pease-Anthony scrubber instead of a cyclone.

The combination of a venturi atomizer followed by a dry cyclone, called the Venturi-Scrubber, has given 85 to 94% sodium recovery on a pilot plant scale with an estimated power consumption for large scale operation of approximately 43 kw.hr./ton of pulp.

Because of the easily attainable high efficiency, low first cost, and simplicity of operation of the Venturi-Scrubber, the addition of any other equipment to the combination to improve the efficiency seems economically unjustifiable.

4. PROGRESS REPORT ON CONTINUOUS REFINING OF HIGH YIELD PULPS WITH DISK REFINERS AT HIGH TEMPERATURES AND ALKALINITY—D. Manson Sutherland

High yield kraft pulps are now being produced on a commercial scale at the mill of the Bathurst Power & Paper Company at Bathurst, New Brunswick, Canada.

The usual stationary digesters, blow tank with agitator and consistency control, vacuum washers are used. Three single rotation disk refiners together with magnets for protection against tramp metals are installed between the blow tank and rotary vacuum washers. At present one jordan is used to break up large pieces of wood before the hot brown stock enters the refiners but plans to eliminate its use are under way. The whole stock including knots and semi-cooked pieces of wood are passed through the refiners.

Increased yield for 50 to 60% has been obtained and it is confidently expected that 65% yield will be reached before there is any falling off of bursting strength or tear. Chlorine number has been raised from an average of 10 to 14 TAPPI standards.

Bursting strength tests of 1.20 points per pound are regularly obtained and on spot tests have reached 1.25 points per pound which is equal to 145% on standard basis weight of 24 × 36—500. This high burst is surprisingly at the freeness of approximately 700 ml. Canadian or what is now considered to be raw pulp.

No operating difficulties with foam or washing have been found either on northern or southern pine kraft pulps.

The capacity of 42-inch units is approximately 80 tons per day when operating at 3.2 to 3.8% consistency. Temperatures of stock approximately 180 to 200°F. Consistency is controlled by added hot black liquor. Refiners producing 100 to 150 tons per day are recommended for brown stock refining so as to reduce the number of units in a pulp mill to the minimum.

Savings—Variations in wood and chemical costs vary from mill to mill. The savings in wood, chemicals and steam are estimated to be not less than $4.00 per ton of pulp.

5. INFLUENCE OF SODIUM SULPHITE AND SODIUM THIOSULPHATE IN THE SULPHATE PULPING OF ENGELMANN SPRUCE — Mark W. Bray, Bernard Singer

A series of pulping experiments was made at the Forest Products Laboratory on Engelmann spruce to determine the effect of replacing either in whole or in part the sulphide content of sulphate cooking liquors in stoichiometric proportions (according to the reducing power of the sulphide) with sodium sulphite and sodium thiosulphate.

The data obtained indicate that both of these chemicals are active pulping agents when used in combination with caustic soda either to replace part or all of the sodium sulphide of kraft cooking liquors. When either chemical is used alone with caustic soda, thus replacing all the sulphide, the strength properties of the pulps are considerably improved over those of pulp made with caustic soda only, but the pulps were not so strong as those made with conventional kraft cooking liquors. When sodium sulphite and sodium thiosulphate were used to replace half the sulphide present in conventional sulphate cooking liquors, pulps much superior in strength to kraft pulps were obtained. If the reducing power of sulphate cooking liquor is doubled through the addition of either sodium sulphite or thiosulphate, pulp strength is increased but not in proportion to the amount of salts added.

In the light of the results obtained, the data suggest that the portion of sulphur forming sodium thiosulphate in the "soda-sulphur" pulping process is equally as beneficial as a delignifying agent and in enhancing pulp quality as that portion of the sulphur which forms the sulphide. The work further suggests the possible advantage of using byproduct sodium sulphite as make up chemical directly in kraft cooking liquors or of diluting kraft cooking liquor with neutral sulphite semichemical spent liquor.

6. SULPHATE PULPING OF DOUGLAS FIR, WESTERN HEMLOCK, PACIFIC SILVER FIR, AND WESTERN RED CEDAR LOGGING AND SAWMILL WASTE—Mark W. Bray, J. Stanley Martin (By title)

Pulping experiments were made at the Forest Products Laboratory to determine the suitability of logging and sawmill wastes from four western species (Douglas fir, Western hemlock, Pacific silver fir, Western red cedar, and various mixtures of these) for the production of strong kraft and bleachable sulphate pulps.

Although higher yields of kraft pulps, based on moisture-free

weights, were obtained from Western hemlock and Pacific silver fir than from Douglas fir, the Douglas fir excelled all the others in yield per unit volume of wood. The lowest yield of kraft and bleachable sulphate pulps, on both a volume and weight basis, was obtained from Western red cedar, but both the kraft and bleachable sulphate pulps from this species excelled all others in several of the most important strength properties, with the exception of tearing strength. Because of these characteristics, proper blending of the fibers of Western red cedar with those from species that excel principally in tearing strength, such as Douglas fir, should be helpful in the production of pulps of balanced quality. In general, the results of the pulping experiments indicated that no difficulty should be experienced in cooking various mixtures of these four western species by the sulphate process and that logging and sawmill waste obtained from them is suitable for the production of good quality kraft and bleachable sulphate pulps.

9:15 A.M. PLASTICS SESSION
(East Ball Room) E. C. Jahm, Chairman

1. BEATER SIZING WITH THE SILICONES—C. J. Bergendahl, C. E. Libby

The synthetic resins have been of interest to the papermaker for some time as a possible substitute for rosin in sizing paper. Among the synthetic resins now available, one group in particular, the silicones, has attracted attention through their many unusual properties, i.e., stability against heat, resistance against chemicals and water.

The first use of the silicones in the paper industry took place during World War II when gas mask filter paper was treated with the vapor from methylchlorosilane. Sizing obtained by this method is excellent but certain disadvantages are connected with the use of the vapor sizing method. Therefore, in this investigation a number of other silicones have been tested regarding their suitability as beater sizing agents.

It was found that one of the silicones, a fast curing resin in a toluene solution, gave very satisfactory sizing both to water and ink. The amount of resin necessary using distilled water in the beating and sheet making procedures was less than 0.1%. It was found also that a mixture of the fast curing resin and an alkaline or acidic emulsion of methyl silicone oil gave good sizing results.

Sizing was obtained when the silicone was added to the pulp stock at a pH value below 7.0. The final pH was not of any importance.

The silicones may be used in sizing the most common types of papermaking pulp and the freeness of the pulp does not affect the sizing result.

The type of water used during the refining and papermaking process is of great importance. A hard water will decrease the sizing effect of the silicones.

The small amount of silicone necessary for good sizing makes the silicones especially suited for the sizing of paper where a large amount of size might cause difficulties.

2. MECHANICAL PROPERTIES OF POLYMERS AS RELATED TO THEIR STRUCTURE—Herman Mark

3. DEVELOPMENTS IN THE TREATMENT OF PAPER WITH SYNTHETIC RESINS—W. L. Abramowitz

Review of potentialities and present industrial practice on the use of resin-paper combinations. Includes the coating, lamination, saturation and molding of paper through the use of hot melts, resin solutions, resin and synthetic rubber emulsions. An exhibit of treated papers will be available for inspection.

4. RESINOGRAPHY—T. G. Rochow, G. E. Coven, E. G. Davis

The industrial importance of fabricated resins has led to the study of their general structure. Since members of the pulp and paper industries are especially interested in the vegetable-filler portion of a resin, this paper concerns only vegetable fillers and these are considered only *in situ* in a resin. Such fillers may be present in more or less natural or synthetic forms in various states of aggregation.

The general study of the structure of resins, including the identification of their microscopical constituents, is conveniently called resinography, analogous to metallography and mineralography. Resinographic studies involve all available, suitable methods, such as analytical chemistry, microscopy, spectroscopy, diffraction, and physical testing. Optical and electron microscopy comprise the most important methods for demonstrating structure and this paper will be composed principally of photo and electron micrographs to illustrate the structure of common vegetable-filled resins. The photomicrographs were taken chiefly by reflected light and the technique for overcoming the poor reflectivity of resin and filler will be described briefly. The electron micrographs were taken chiefly by use of positive-replicas and the technique for obtaining such replicas will be mentioned.

Resinography serves:

1. To identify the filler to a certain degree which is not yet equal to the extent of classification possible by examining separate particles free of resin by transmitted light or electron beam. Techniques are being explored, however, to extend the degree of classification of a filler.

2. To indicate the functional aspects of the filler, such as size, shape, and distribution of filler particles, extent of coating and impregnation of the particles, visibility and light-scattering of the particles, and so forth.

5. THE PROPERTIES OF FLEXIBLE IMPREGNATED SHEETS—A. W. Oliner, F. W. O'Neil (By Title)

The addition of synthetic resins to paper produces many changes in the properties of the sheet. The magnitudes of these changes are dependent upon the nature and physical state of the resin, the method of resin addition, the physical state of the cellulose fibers, and the conditions of the heat treatment which may be used after drying the impregnated sheet.

This paper discusses the addition of thermoplastic resins and rubbers, in various forms, to pulps both in sheet form and in the beater. The effects of both beater addition of the resins and the saturation of the paper sheet with them have been investigated. The beating of the fibers, prior to the addition of the resins, on the properties of the impregnated sheet are described. It is shown that by heating the impregnated sheet, after drying, to a temperature approximating the softening point of the resin impregnant, the properties of the sheet may be altered considerably from those of the dried but uncured sheet.

The properties of the sheets which were used for a comparative evaluation of physical strengths were burst factor, tensile strength, elongation, tear factor, bulk factor, stiffness and porosity. The "Valley" size test was also made on the sheets. The values shown are the "optimum" values, i.e. the impregnated and dried sheets were heat-treated to produce the highest burst and tensile strengths, regardless of the effect of this treatment on other properties. In addition, the retention of resin, and the effect of the resin on the freeness and the drainage time of the stock furnish were determined on the resins which were added to the stock in the beater.

Explanations are proposed for certain of the phenomena noted in this investigation.

6. PAPERS FOR PLASTIC LAMINATES — John C. Pitzer

Laminated plastics are distinguished from other plastic materials in that they are available in much larger areas of thin cross-section. Paper is used as a base for the majority of laminated plastics that are used in the electrical industry. Other uses for paper base laminated plastics are structural such as refrigerator door liners and decorative for such applications as table tops, etc. Practically all types of paper pulp such as kraft, sulphite, and alpha are used in papers for laminated plastics in one form or another. Some of the properties in a paper which are influential on the quality of finished laminates are: "wildness," sizing, absorbency, bulk factor, and pH. Each of these factors have some bearing on all finished laminated materials but each particular type of laminated material may be influenced more by one individual property of the paper than by a combination of several properties. Cleanliness of paper for laminated material is quite important, especially in materials which are to be used for certain electrical or decorative applications when the dirt may be seen in the surface.

7. METHODS FOR COMBINING RESINS AND PAPER—E. S. Bauer

Off-machine, wet-web and beater addition methods of combining paper and phenolic resins are briefly described. The three methods are then discussed in an effort to point out relative advantages and disadvantages of each method.

Cost considerations suggest the use of either the wet-web or beater addition methods providing a long run of a single grade of treated paper is required. These systems are of particular importance to paper manufacturers because they involve the saturation of the sheet on the paper machine. They are, in general, limited to the production of long runs of a particular grade. The mechanical and electrical properties obtained are limited as compared with the off-machine treating method.

The off-machine treating method is the conventional system used by the laminating industry. It is the most versatile of the three systems under discussion and allows for the use of the widest variety of paper and resin types. For this reason, the method allows for the production of products having optimum mechanical and electrical properties.

Each method is used to the full advantage of its merits. In only a few cases do the materials made by one process compete with the others. The two newer methods, wet-web and beater dispersion, have augmented rather than replaced off-machine treated stock.

2:00 P.M. Coating & Nonfibrous Materials Testing Session
(West Ball Room) R. M. K. Cobb, W. F. Hathaway, Chairmen

1. HOW TO DETERMINE THE DESIRABLE RHEOLOGICAL PROPERTIES OF COATINGS — Henry Green

This paper endeavors to answer two fundamental questions for the rheologist who wishes to measure the consistency of paper coatings. First, what is consistency? Second, what kind of viscometer is required for measuring it? The answers are based on the pioneering work of Bingham and his concept of plastic flow.

2. THE ADHESION OF HIGH POLYMERS TO CELLULOSE—A. D. McLaren

The adhesion of high polymers to cellulose involves a number of physical perameters including the dielectric constant of the polymer, the dipole moment of polymer constitutents, the facilities for hydrogen bonding at the polymer cellulose interface and the micro-Brownian movement of chain segments. Here the influence of polar group concentration and polymer viscosity only, will be considered.

The concentration of carboxyl groups (maleic anhydride residues), was varied in a polymer composition of vinyl chloride-vinyl acetate copolymer admixed with vinyl chloride-vinyl acetate-maleic anhydride interpolymer. Such compositions were coated on regenerated cellulose.

Experiments showed that adhesion to regenerated cellulose, which was assumed to be a measure of the COOH→OH dipole-dipole bonds formed, increases in a manner expressible by

$$\text{Adhesion} = k\ (\text{COOH})^{a}$$

reminiscent of the Freundlich sorption isotherm. At any given carboxyl concentration adhesion increases with temperature. This may be interpreted as indicating that the development of an adhesive bond involves an exothermic heat of sorption as well as the highly endothermic activation energy for viscous flow. The latter energy is a measure of the process of the chain segment motion which is necessary to permit more dipoles within the polymer to approach the vicinity of the active centers in the substrate. Application of the Guzman equation relating the viscosity to the activation energy for viscous flow to the rheological measurements on the polymer composition shows this energy to be of the order of —30,000 calories (endothermic). Application of the Clausius-Clapeyron equation to the measurements on adhesion gives the heat of adhesion involved in the combined processes to be —12,500 calories. By difference, one may obtain the heat of sorption for maleic anhydride residues groups on cellulose to be approximately +17,500 calories (exothermic).

3. APPLICATIONS OF STARCH VISCOSITY TO THE PAPER INDUSTRY—W. G. Bechtel, C. C. Kesler

Viscosity is measured as the torque against a propeller which is rotated in the paste at constant speed.

The viscometer can be used to determine the effect of concentration, temperature and time of cooking, pH, rate of stirring, and of added materials on the viscosity of starches. Enzyme conversions can be made in the viscometer and the effect of altering various conditions can be studied advantageously. It is also possible to study the changes of viscosity of starch pastes when they are cooled. Such studies show the great differences between various starch products and may be correlated with their uses.

4. EFFECT OF UREA RESINS ON STARCH CLAY COATING COMPOSITIONS—P. S. Hewett, R. E. Carter, R. J. Church

The use of urea resins along with starches as adhesives for clay coating compositions is studied. The variables encountered in using urea resins along with starch in clay coating compositions is discussed with particular emphasis on time temperature and pH. Three types of coating starches are considered, enzyme converted, acid hydrolyzed and chlorinated. Coating colors prepared using various proportions of urea resin to starch are evaluated. Several catalysts are used with these coating compositions and their effect on viscosity and conversion given.

The use of urea resins with starch as adhesives for clay coating compositions results in definite advantages over straight starch adhesives. The most marked improvements are in water resistance, brightness and wax test. Mill experience shows that coatings of this type have a definite place in present and future markets.

5. TESTING CLAYS FOR PAPER MACHINE AND BRUSH COATING—Ivan L. Lester, S. C. Lyons

Testing methods of clays for coating should measure production quality and functioning of clay in coating mills. Most important property of clay is particle size which affects finish, viscosity, and hiding power. Sedimentation methods, especially those which employ centrifugally accentuated settling forces, have been most successful for particle size determinations on the research level. A simple, abridged centrifugal, empirical test has proved to be sufficient for control testing.

Brightness-determination samples must be carefully prepared, with uniform comminution, drying, and sample-compacting pressures.

Viscosity and related flow properties can seriously affect coating machine operation. Tests made on "colors" involving clays and adhesives do not adequately measure clay factors because of variations in adhesives. A method which measures viscosity of dispersed 70%-solids aqueous suspensions of clay with rotation-type viscometers offers promise as a testing method.

Moisture may be determined by difference or by the toluene-distillation method.

Reagent (or dispersant) requirement of the clay is critical. Minor changes in dosage of chemical may involve major changes in viscosity and completeness of dispersion. A practical method is to successively add increments of reagent, measuring viscosity after each addition until a minimum viscosity has been established.

Miscellaneous tests include pH, screen residue, color, acidity, and hand sheets. pH is determined electrometrically on 20%-solids suspension. Screen residue is determined on 200- and 325-mesh. Color is visually observed by comparison of water pastes of sample and a standard clay. Hand sheets are prepared using a film applicator and a standard coating formulation.

Indications of such hand sheets must be considered in light of varying viscosity, coat weight, and coat thickness.

2:00 P.M. Plastics Session
(East Ball Room) E. C. Jahm, Chairman

1. REPULPING OF MELAMINE RESIN-TREATED

WET-STRENGTH PAPER—Donald D. Niemeyer, Loren V. Forman

Various experimental repulping procedures were applied to melamine resin wet-strength broke to demonstrate their effect on the quality of the stock produced and to obtain data that would be of value in commercial operations. The procedures consisted of (1) soaking the paper before defibering in a beater, (2) cooking the broke in pressure vessels, (3) exposing the paper to high temperatures and humidities, (4) cutting the paper into small particles followed by beater treatment, (5) defibering with a disk refiner or a rod mill, and (6) cooking the wet strength broke with wood chips by the kraft process.

Data are also given for the operation of a commercial installation of the Steam Jet Process. This is performed in a beater while steam is introduced through nozzles mounted on the sides of the beater between the roll and backfall. At temperatures approaching the boiling point and in the presence of alum, a completely defibered stock having a high freeness and good physical properties is produced.

An acidity greater than that obtained with alum promotes hydrolysis of the melamine resin at elevated temperatures but it causes degradation of stock. If alkaline conditions are used, hydrolysis is retarded and the broke defibers very slowly.

2. A STUDY OF THE WET STRENGTH MECHANISM. THE EFFECT OF MELAMINE RESIN ON THE BONDING OF PAPER FIBERS—D. J. Salley, A. F. Blockman

The effect of melamine resin used in producing wet-strength paper on the "ultimate strength" of fibers and on the "adhesion" (or bonding) between fibers in paper has been examined by means of tensile strength tests at both zero and 1-inch spans and by a shear adhesion test. The results indicate that almost the entire effect of the resin in increasing the wet strength of paper arises from an increase in adhesion between fibers, the ultimate fiber strength being increased but little. Further, the upper limit to the wet tensile strength of a sheet is fixed by the zero span value of the wet sheet and not by the tensile strength of a dry sheet as ordinarily measured. Roughly speaking, the resin is about equally effective in increasing the adhesion between fibers whether the paper is wet or dry. This suggests that the resin forms bonds of a certain strength between fibers and this strength is not decreased by wetting. Because of the greater opportunity for bonding between fibers as fibrillation of a pulp increases, the resin becomes more effective in increasing adhesion as beating proceeds, at least up to a point.

3. INFLUENCE OF OXIDATION OF PULP ON WET STRENGTH—M. O. Schur, R. M. Levy

Based on the hypothesis that the cross-linking of cellulose chains may be common to the various known methods of increasing wet strength, it was predicted that oxidation of pulp should improve the wet strength of the paper made therefrom. A study was accordingly made of the effect of oxidizing a semibleached kraft pulp with sodium periodate or with sodium hypochlorite in aqueous solution on the beating characteristics of the pulp and on the properties of handsheets prepared from the beaten pulp. It was found that pulp treated with periodate becomes progressively more difficult to beat the more the pulp is oxidized. Handsheets prepared from the pulp indicate a corresponding loss in dry tensile strength and an increase in porosity. It is particularly noteworthy that these handsheets are all relatively high in wet strength. When the periodate treated pulps are subjected to a secondary oxidation with chlorite, they regain relatively normal beating and sheet-making characteristics, but revert in wet strength. On the other hand, pulp treated with hypochlorite, either at pH 7 or pH 9, develops slowness during beating more rapidly than the untreated pulp. The dry tensile strength of the corresponding handsheets is increased, except where the viscosity has been greatly decreased by the oxidant; and the handsheets become less porous. The wet strength of the handsheets is higher than in the case of the untreated pulp similarly beaten, though not as high as in the case of the periodate treated pulp. The level of wet strength gained, within the limits of the experimental conditions studied, appears to depend upon the degree of oxidation and upon the method of oxidation; fiber length also enters as a factor.

1:45 P.M. Mill Instrument Control Session
(Room B-C) R. W. Porter, Chairman

1. A GENERAL STUDY OF KRAFT MILL INSTRUMENTATION—R. M. Brown

The article discusses in a general manner the application of indicating, recording, and controlling instruments to the various processes in a typical bleached kraft pulp mill. Each department is considered with some emphasis on the bleach plant and black liquor preparation instrumentation. The types of instruments used and the reasons for their use are discussed. The article closes with some notes on the selection of instrument equipment and panel design and layout. It is pointed out that this article is a preliminary review of the overall instrumentation of a kraft mill and that other articles describing in detail the instrumentation of the various departments will follow.

2. IMPORTANCE OF CHART RECORDS TO EFFICIENT KRAFT MILL OPERATION—Robert R. Fuller

3. MEASUREMENT AND CONTROL OF pH IN PULP AND PAPER MILLS—A. L. Chaplin

2:00 P.M. Microscopy Session
(Room A) Thomas Fyfe, Chairman

1. EVALUATION OF DIFFERENT METHODS OF SPECK COUNTS IN PAPER—John H. Graff

An extensive study has been made of various methods which might be used in the determination of the speck count in paper. The largest number of specks and the largest area per square meter are obtained by using one 20-watt daylight fluorescent lamp with reflected light. An excessive amount of reflected light reduces the total number of specks observed because of glare and internal reflection. It may be desirable to vary the type of illumination (transmitted or reflected light), depending upon the ultimate use of the paper. When marking all the specks visible with a given illumination and a 14-inch chinrest, the number and the area of the specks per square meter are practically the same whether all the specks in the sheets or only those visible in selected 5- or 20-square inch sampling areas of each sheet are considered. A detailed frequency distribution of the specks by number or by area seems to be less important than the percentage distribution by number and by area of small, medium, and large specks. This considerably reduces the time required for direct measurement and analysis of the specks. The personal equation is considered and the time for making a speck analysis is estimated.

Thursday, February 27, 1947

9:00 A.M. Papermaking Session
(West Ball Room) A. E. Bachmann, O. E. Hedbring, Chairmen

1. WHITE WATER SYSTEM FOR CYLINDER BOARD MILL—O. E. S. Hedbring

Recirculation of white water is common practice in cylinder board mills. However, many mills have gone only part way and will do well to reexamine their white water system because of probable legislation for the abatement of stream pollution. Substantial savings can also be realized in a properly designed system.

Consistent with good mill operation, the desired objectives are (1) to reduce heat, fiber and chemical losses to a minimum; (2) to clean up the mill effluents sufficiently, at least to meet future legal requirements; (3) to reduce the quantity of fresh water if the cost of water *per se* is appreciable and (4) to eliminate sudden and heavy steam demands due to heating process water.

It is important that the white water systems be proportioned correctly. In mills having low pressure boilers and where steam balance is a problem irregular and excessive steam demand in heating process water is often the direct cause of the trouble.

A saveall is usually required to clean up the final mill effluents. Regardless of the type of saveall employed, maximum efficiency of the white water system restricts its functions: (1) to provide clarified white water where rich white water cannot be utilized; (2) to clean up the final mill effluents.

To pass rich white water which can be recirculated ahead of the saveall into the latter necessitates a larger installation than is actually required, increases operating costs and temperature losses.

The savings effected in closing up the white water system generally pay for the investment in less than a year.

2. WHITE WATER CLARIFICATION BY MEANS OF THE MARX FILTER—Clyde A. Benson, Harold E. Brakewood

The primary functions of the Marx filter are to remove the greatest possible amount of suspended matter from white water prior to its reuse or discharge to the stream, recovery of solids for reuse in the sheet, and reduction of heat loss. A Marx filter consists of two large steel cones, one inside the other, with a space between them, the inner cone being truncated. There are no moving parts. White water is fed into a small cone shaped receiving well at the top, and overflows onto an inverted deaeration cone directly under the deceiving well and into the center of the filter. The white water is clarified by settling of the solids in the bottom of the outside cone from which the solids are drawn off and put into process, and the clarified water rises to the top of the outside cone and flows over a weir into a collecting trough from which it is conducted to the stream or returned to the papermaking process.

Two folding boxboard mills which are using the Marx filter for white water clarification are the Robertson Paper Box Company at Montville, Connecticut, and the National Folding Box Company at New Haven, Connecticut. At the former plant a Marx filter of 79,000 gallons capacity clarifies 1000 g.p.m. of white water from the six-cylinder machine, trimming 65 inches, and from screens and other sources of white water. Average figures compiled from four months continuous operation show the following results:

Influent	4.95 pounds per 1000 gallons
Effluent	0.45 pounds per 1000 gallons
Fiber removal, %	91.0%

At the latter plant, there are two Marx filters, the first of 96,000 gallons was installed in 1933, and the second of 130,000 gallons was installed in 1945. There are two board machines, one 6-cylinder, trimming 122 inches and one 7-cylinder, trimming 132 inches. Average figures from nearly fourteen years continuous operation of one Marx filter show the following:

Influent	2.7 pounds per 1000 gallons
Effluent, bottom sludge	5.1 pounds per 1000 gallons
Effluent, top, clarified	0.26 pounds per 1000 gallons
Fiber removal	90.3%

3. VARIATIONS AND SIMILARITIES OF PAPERBOARD MILL WHITE WATERS—Willem Rudolfs, E. J. Axe

Wastes produced in the reprocessing operation vary considerably from mill to mill and from several units in the same mill. Quality and type of raw material, layouts of physical plants, daily production capacity, and facilities for recovery of fiber and water, the cycles of operation separately and collectively, influence the volume and character of the waste. Established procedures in individual mills operating in regular cycles discharge waste of rather definite characteristics peculiar to the mill.

The volume of waste averages about 10,000 gallons per ton of product with a strength similar to strong domestic sewage. The wastes oxidize at about the same rate as sewage during the first few days. Average suspended and total solids amount to about 43.5 and 150 per ton product respectively, with a population equivalent of 240 people. Suspended solids average about one third of the total solids, of which over 90% is settleable, and exert about 40% of the total BOD. However, the nonsettleable finely divided material (9%) have about the same BOD as the settleable solids. The soluble material has about 60% of the total BOD.

Wastes from individual machines are similar to the wastes of the mill and vary in concentration of solids with the efficiency of operation.

Recovery equipment of the vacuum filter type is less effective than coagulation and settling for removal of suspended material. When sweetener stock is used, the effectiveness is increased. The average reduction of suspended materials by recovery equipment is about 60% and removal of BOD about 20%.

Fiber losses varied from 2.5 to 6.0 pounds per 1000 gallons or from 2.5 to 80 pounds per ton product in board mills and from 25 to 125 pounds per ton of product in specialty mills.

Complete removal of suspended solids does not solved the pollution problem.

4. DIATOMACEOUS FILTERAID FILTRATION OF PAPER MILL WATERS AND EFFLUENTS—Gordon G. Halvorsen

Diatomaceous filteraids, which are very similar to diatomaceous paper aids, have been tested for filtration of paper mill process and white waters. Laboratory pressure and vacuum filtration tests and pilot plant pressure filtration tests have been made in several paper and paperboard mills. The results of the data given show that clarified waters are obtained at high filtration rates. These results have shown that fresh water which has proven unsatisfactory for use in low volume showers can be filtered at very high rates of flow and at a low cost.

Filtration tests on white waters and effluents show filteraid filtration to be economically feasible by returning the filtercake containing filteraid and suspended solids to the beaters. The clarified water can be successfully recirculated to low volume showers, further reducing fresh water consumption. The tests which have been made indicate filtration cycles on average mill white waters of 3 to 8 hours at 30 gallons per square foot per hour using 4 to 16 pounds per 1000 gallons of filter-aid at filtration pressures up to 60 pounds per square inch.

It is estimated that a filtration system of this type would show savings greater than the operating costs and substantially eliminate stream pollution problems.

5. STUDIES IN SLIME CONTROL — 1946 — John W. Appling, John F. McCoy, B. F. Shema

The authors report various fundamental studies related to slime control which are in progress at The Institute of Paper Chemistry. A resume of laboratory evaluations of disinfectants recommended for use in the paper industry is given. Details of a laboratory study of the effect of pH upon toxicity value of Lignasan, Merfenel A, Dowicide G, and Roccal as determined by the streak plate method indicate clearly that the choice of an effective mill disinfectant should be based on prevailing pH conditions, among other factors.

During a period of five months numerous attempts were made in a kraft mill and a book mill to correlate bacterial counts of the mill systems with slime formation at different levels of dosage with Lignasan and Pyridose. Not only did many uncontrollable factors resulting from changes in operating conditions interfere, but no serious slime conditions were encountered in either mill.

Attention was then directed to groundwood pulp mills in which there were real slime problems and for which operating conditions appeared less subject to variation. Meanwhile, two important developments had taken place in laboratory studies related to slime control. One was a method of determining the probable minimum effective dosage of a given disinfectant, and the other was a simple and rapid method for the determination of toxic residuals in the mill system being treated. Use of the latter made it possible to study the duration of Lignasan, Pyridose, and Santobrite residuals in mill systems when any of these materials was present singly.

The effect of Pyridose on slime control was studied in groundwood pulp mill No. 1. Again slime control was not satisfactory as judged by slime formation; however, the bacterial counts were lowered considerably and the slime was in general more easily removed during the clean-up.

The most extensive study was made in groundwood pulp mill No. 2 where Lignasan alone was used at different dosage levels for eight consecutive weeks and Lignasan alternated with Santobrite was used at one dosage level for two weeks. After various treatments with Lignasan alone, it appeared probable that this material might not completely eliminate slime from this mill. The use of Santobrite alternately with Lignasan on a daily dosage basis for two weeks indicated clearly an improvement in slime control.

9:00 A.M. Preparation of Papermaking Materials and Chemical Methods Session (Room B-C)

P. P. Gooding and P. H. Wehmer, Chairmen

1. STUDIES OF ROSIN SIZING. II. THE EFFECT OF ALUMINA ON ROSIN SIZING—D. Price

In an attempt to resolve some of the present conflicting opinions about the role of alumina in the formation and performance of an effective rosin size precipitate, a recently developed analytical method was used in conjunction with laboratory papermaking to determine when alumina was formed in the system and what its effect was upon sizing.

The study showed that alumina was not a component of a standardized size precipitate which was an effective sizing agent, but that alumina was often introduced into the papermaking system by neutralization by alum of excess alkali in the water or in the pulp. It was found that alumina produced by the addition of NaOH to the stock was detrimental to sizing. This effect was measured by the fluorescence size, Valley size, and news ink tests. The tests are named in order of increasing effect of a given amount of alumina on the measured test time. The results were compared with those obtained by other investigators for sizing with alumina sols alone. Their results obtained with sols as well as the present results obtained with alum and rosin size seem best explained by the suggestion that alumina, *per se*, is not particularly detrimental to sizing; that its deleterious effect is due (a) to replacing the size on the fiber and (b) to carrying water-attracting materials adsorbed on its surface.

It was also found that $NaHCO_3$ was less harmful to rosin sizing than equivalent amounts of either Na_2CO_3 or NaOH. Some factor in addition to the alumina formation was presumed to be operating in this case.

Water treatment with acid was considered from the standpoint of alumina repression or destruction, and the use of sodium aluminate in papermaking was similarly evaluated. In agreement with previous results on the effect of alumina on rosin sizing, the repression of alumina improved, and the formation of additional alumina impaired the sizing obtained.

2. ROLE OF RESEARCH IN SUPPLYING FIRST CUT LINTER COTTON FOR PAPERMAKING—Earl M. Brennan, Jerry H. Moore

3. A REVIEW OF SOME STUDIES RELATING CHEMICAL CONSTRUCTION OF PULPS TO THEIR PHYSICAL PROPERTIES—T. A. Pascoe

A review of some of the literature on the subject indicates that there is a sizeable body of evidence available to show relationship between the chemical constitution of pulps and their physical properties. Among carbohydrate-like substances whose presence seem to influence physical behavior may be mentioned, gamma cellulose, galacturonic acid and other similar constituents of the holocellulose fraction. Lignin and like materials also exert a marked effect on strength and beating characteristics. The studies already made indicate numerous additional avenues to explore. Certain other suggestions are made for further work based on methods not previously available. The technical and economic value of work of this nature is pointed out.

4. A MICRO IODOMETRIC METHOD FOR THE DETERMINATION OF GLUE OR GELATIN IN PAPER—G. E. Naponen, M. J. Dries, A. S. O'Brien

A simple micro iodometric method for the determination of organic nitrogen is proposed. The distinct advantages of the new method over the regular Kjeldahl method with regard to speed, apparatus, and technique required, are pointed out. The method involves the destruction of the organic matter by hydrogen peroxide and sulphuric acid, followed by the oxidation of the resulting ammonium ions to nitrogen by an excess of hypobromite in slightly alkaline medium. The excess of hypobromite is back-titrated with a standard sodium thiosulphate solution after the addition of potassium iodide and acid.

The two most important features of the new procedure are:

1. In the destruction of the organic matter with 30% hydrogen peroxide the sample is first soaked with hydrogen peroxide and then treated with sulphuric acid, rather than the usual procedure of adding the hydrogen peroxide to hot sulphuric acid.

2. The relatively unstable sodium hypobromite solution is replaced by two solutions, a hypochlorite and a potassium bromide solution, which are both added to the digested sample at the time of analysis.

The new iodometric method yields results which are just as reliable as those by the Kjeldahl method for glue or gelatin in paper. The method is also applicable to the determination of protein in flour or wheat.

5. SODIUM CARBOXYMETHYLCELLULOSE FOR PAPERMAKING—Eleanor F. Horsey

Carboxymethylcellulose sodium salt (CMC) has been employed in various papermaking operations. The procedures described include surface applications on paper and paperboard and internal addition at the beater at varied basic weights and freenesses. The surface coatings gave increases in resistance to the penetration of oils, waxes, etc., as well as generally improved surface properties. Addition at the beater produced a stronger, more highly sized sheet at high freenesses and a less opaque, less porous sheet at low freenesses. The specific types of CMC best suited for these uses are characterized by substitution and viscosity. Mention is also made of the potentialities of the ammonium salt and of viscosity types of CMC other than those used in this work.

6. DETERMINATION OF CARBOXYMETHYLCELLULOSE IN PAPER—R. W. Eyler, R. T. Hall

A method for the quantitative determination of carboxymethylcellulose in paper samples is described. The method involves extraction of the sample with sodium hydroxide, treatment with sulphuric acid to produce glycolic acid from the carboxymethylcellulose, and colorimetric measurement of the glycolic acid. Results are corrected for the apparent carboxymethylcellulose content of untreated pulp. The presence of other additives such as rosin size, urea-formaldehyde resin, and clay does not cause appreciable interference.

7. EFFECT OF SAMPLE PREPARATION ON ANALYTICAL VALUES FOR ALPHA-CELLULOSE, COPPER NUMBER, AND CUPRAMMONIUM VISCOSITY—B. L. Browning (By title)

The method of preparation of pulp samples for analysis may have an important effect on the results obtained. A comparative study has been made of various types of preparation for the determination of alpha-cellulose, copper number, and cupramonium viscosity. Disintegration may alter the analytical values considerably, particularly if the machine is fitted with too fine an exit screen. For alpha-cellulose determinations, the pulp is preferably reduced in size by a very mild treatment, such as tearing apart by hand.

8. THE DETERMINATION OF ALPHA-CELLULOSE IN UNBLEACHED PULPS—Paul F. Cundy, Maxine Murphy Beck (By title)

The presence of lignin, a noncellulosic material, in the alpha-cellulose residue from unbleached pulps requires that a correction be made therefor. This may be done by determining the lignin content of the residue but this is a time-consuming operation of questionable accuracy. Delignification of unbleached pulps with sodium chlorite prior to the determination of alpha-cellulose has been found to be less time consuming and yields alpha-cellulose values lower than those obtained by the conventional method. This difference appears to be the result of removal, after delignification, of hemicellulosic materials which are protected from alkaline dissolution by lignin in the usual method. For this reason, alpha-cellulose obtained after delignification of the pulp more accurately expresses the true resistant-cellulose content of the pulp. Details are given for a proposed method embodying the use of sodium chlorite as a delignifying agent.

1:00 P.M. ANNUAL LUNCHEON (Grand Ball Room)
G. W. Nicholson, Presiding

1. ADDRESS—Gerald Wendt

2. PRESENTATION OF TAPPI MEDAL AWARD to Peter J. Massey by Lyman Beeman

3. PRESENTATION TO THE TAPPI CHICAGO SECTION

4. PRESENTATION TO THE TAPPI OHIO SECTION